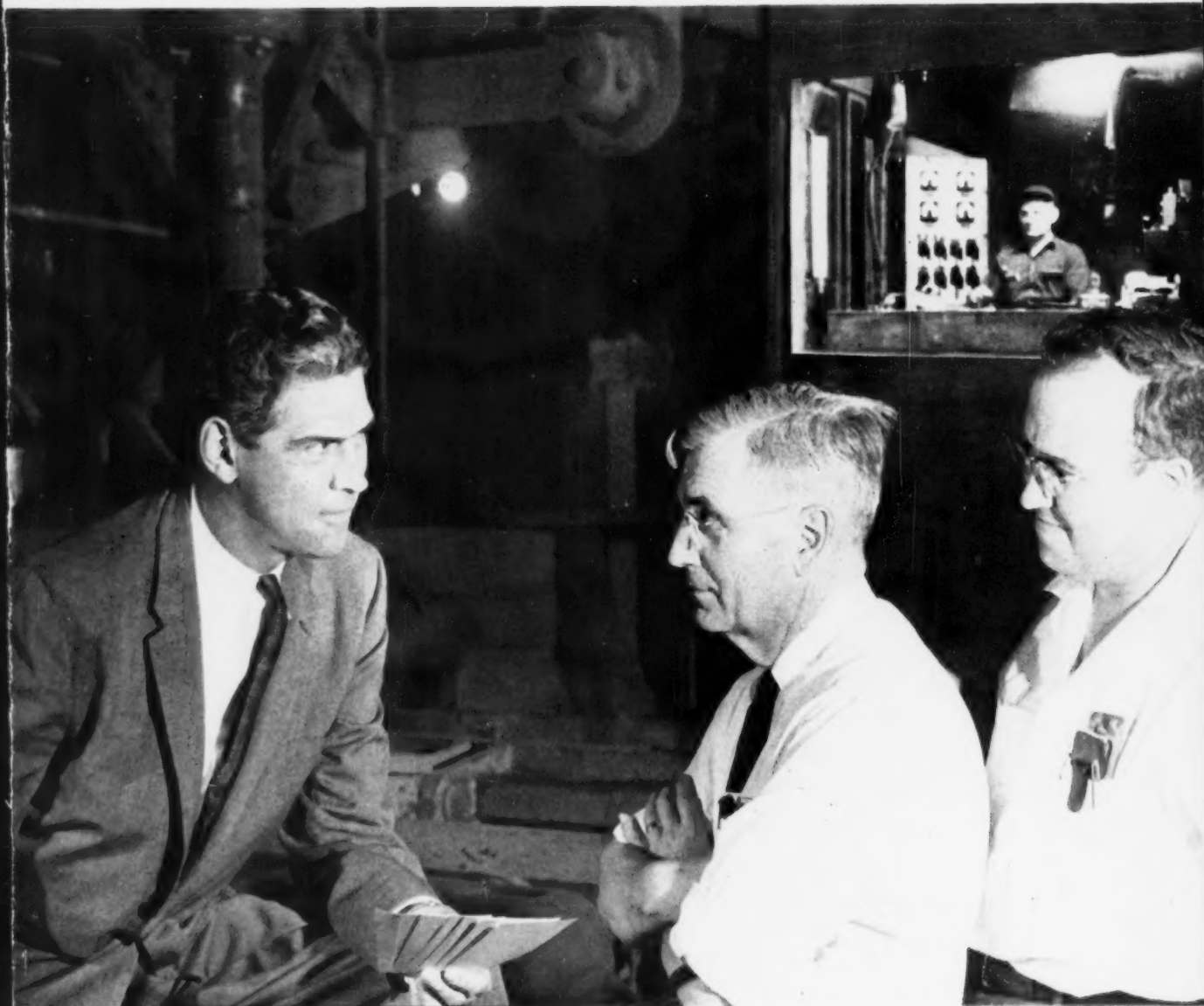


# The IRON AGE

August 1, 1957

The National Metalworking Weekly



**Mill Automation:  
Better Steels Ahead**  
**P. 51**

**Steel Gets Set For  
Price Hearings** — P. 56

**Market Outlook For  
Industrial Furnaces** — P.132

**Digest of the Week** P.2-3

## THE OTHER TURN



The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.



**BASIC INCORPORATED**

845 HANNA BUILDING • CLEVELAND 15, OHIO





## How to cut your wire-handling costs

You might be surprised at how much you can trim your costs with better methods of handling steel wire. For example, we often find that when coils of wire are unloaded in customers' plants they are simply piled on the floor. This wastes valuable floor space, and clutters the aisle. And moving the wire along to the production line becomes a headache.

One customer's excellent solution to the wire-handling and storage problem is shown above. The racks, built largely from steel pipe, more than triple the storage capacity of the floor area. Coils are out of the way, yet they're easily moved by lift truck.

Another customer wanted to avoid shutting down his cold-heading machines every time a coil of wire was used up. We showed him how to set up the wire coils on two pay-off reels so that no interruptions were necessary when one coil was welded to the other.

Users of wire in large coils often have a handling problem.

In working out practical handling methods for extra-heavy coils, we try to help the customer avoid the nuisance and expense of returning pallets or containers.

Because we handle so much wire in our own plants, we have developed a lot of time-saving methods which we're glad to pass along. And we're ready to do more than just offer general suggestions. If you wish, we'll provide you with drawings and specifications for such things as pipe racks, pay-off reels, and other equipment that may help you to cut your wire-handling and storage costs.

Our main job is to make top-quality steel wire to meet a wide range of requirements. But our service goes far beyond simply taking your order and shipping the wire. So don't hesitate to call our nearest sales office if you have a wire problem.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation, Export Distributor: Bethlehem Steel Export Corporation

# BETHLEHEM STEEL



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Chestnut and 56th Sts.  
Philadelphia 39, Pa.  
SHerwood 8-2000

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One of the Publications Owned and  
Published by Chilton Company, Chest-  
nut & 56th Sts. Philadelphia 39, Pa.

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Copyright 1957 by Chilton Company  
The Iron Age is published every Thursday  
by CHILTON COMPANY, Chestnut & 56th  
Sts., Philadelphia 39, Pa. Entered as second  
class matter, Nov. 8, 1932, at the Post  
Office at Philadelphia under the Act of  
March 3, 1879. Price to the metal-working  
industries only or to people actively en-  
gaged therein, \$5 for 1 year, \$8 for 2 years  
in the United States, its territories and  
Canada. All others \$15 for 1 year; other  
Western Hemisphere countries, \$15; other  
Foreign Countries, \$25 per year. Single  
Copies One Cent. Annual Review Issue \$2.00.  
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# The IRON AGE

August 1, 1957—Vol. 180, No. 5

## Digest of the Week in

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\*Steel Takes Its Case to Congress 56  
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### NEWS ARTICLES

#### GILSONITE PROJECT

**Vast Potential Opens** — A new future for petroleum-like materials is opened up by vast gilsonite project. Moving material 72 miles by pipeline, processing by new methods into new products, is all part of \$18 million project. P. 54

#### PRICE HEARINGS

**Strong Defense**—The steel industry won't take the 5th Amendment



when it is called upon to justify its price policies. A strong case can be made why higher wages, higher costs of expansion must come from prices. P. 56

#### TINPLATE

**Showpiece Unveiled** — Youngstown Sheet & Tube's new tinplate mill at Indiana Harbor winds through eight separate buildings. It runs at speeds up to 2200 fpm. Its temper mill is driven by backup rolls. P. 59

#### RAILROAD FINANCING

**Government Trust** — Eastern railroads, hard-pressed to obtain financing, ask giant, federally financed equipment trust. Equip-

# Metalworking



ment is needed, but roads need financial assistance to place orders. J. M. Symes, Pennsylvania Railroad president, told a House committee that less than half of the true needs for new equipment can be met by existing sources. P. 60

## MOTIVATION RESEARCH

**For Metalworking?**—You may be surprised to know that this controversial marketing tool is building up a case in selling manufacturers' goods. Here's a case history plus other pointers on MR. P. 67

## FEATURE ARTICLES

### TO BOOST HOT STRENGTH

**Add More Vanadium**—It can be used in place of molybdenum in low alloy steels to make them more serviceable at high temperatures. To get this improvement, it's necessary to use higher normalizing temperatures. P. 91

### WHEN DESIGNS CHANGE

**You Need Flexibility** — Mass production demands all the mechanized equipment you can muster. That's if you want the maximum in output and product quality. But beware the danger of equipment that can't be easily adapted to a new design in your product. Here's some advice. P. 96

### POWDERED METALS

**Steam Adds Strength** — Many manufacturers report that strength

and wear resistance of powdered metal parts increases when they're treated with superheated steam. Here's how it's done, simply. P. 98

### BRAZING TITANIUM

**Pick Right Method** — Titanium and its alloys can be brazed and soldered successfully. There are a number of techniques, each with advantages and disadvantages. Choice of method, filler metal, and flux is important. P. 100

### HOT PAINT SPRAY

**Yields Better Finishes** — Hot spray painting offers better quality finishes at lower cost. It produces a heavier film while still saving paint and physical effort. Wet sanding costs are cut by as much as 25 pct in some instances. P. 104

## MARKETS & PRICES

### STEEL CORNER TURNED

**Outlook Improves** — It looks as though the steel market has taken a definite turn for the better. Improvement is not sensational, but the trend is there. Some users are fretting over inventories. P. 131

## NEXT WEEK

### PACKAGING

**More Appeal, Less Cost** — The axiom that an attractive package sells more products goes for industrial as well as consumer goods. Next week, a top industrial packaging consultant will report on how to put across product appeal at lower packaging costs.

**MILL AUTOMATION:** Behind the push for greater use of automatic control is mill drive for better quality. While primary and roughing operations get the most emphasis, other applications are found on hot strip, structural and tinplate mills. P. 51

### INDUSTRIAL WIPERS

**Paper Makes Inroads** — More metalworking companies are going in for paper wipers. Some reasons: economy, disposability, reduced fire hazards, safety. One paper firm reports sales are 31 pct higher this year. P. 58

### AUTO NOISES

**Problem for Engineers** — Automakers go to a great deal of trouble and expense eliminating noises before car designs are released for production. Sound engineers use hi-fi equipment to help track down unwanted squeaks and rattles. P. 68

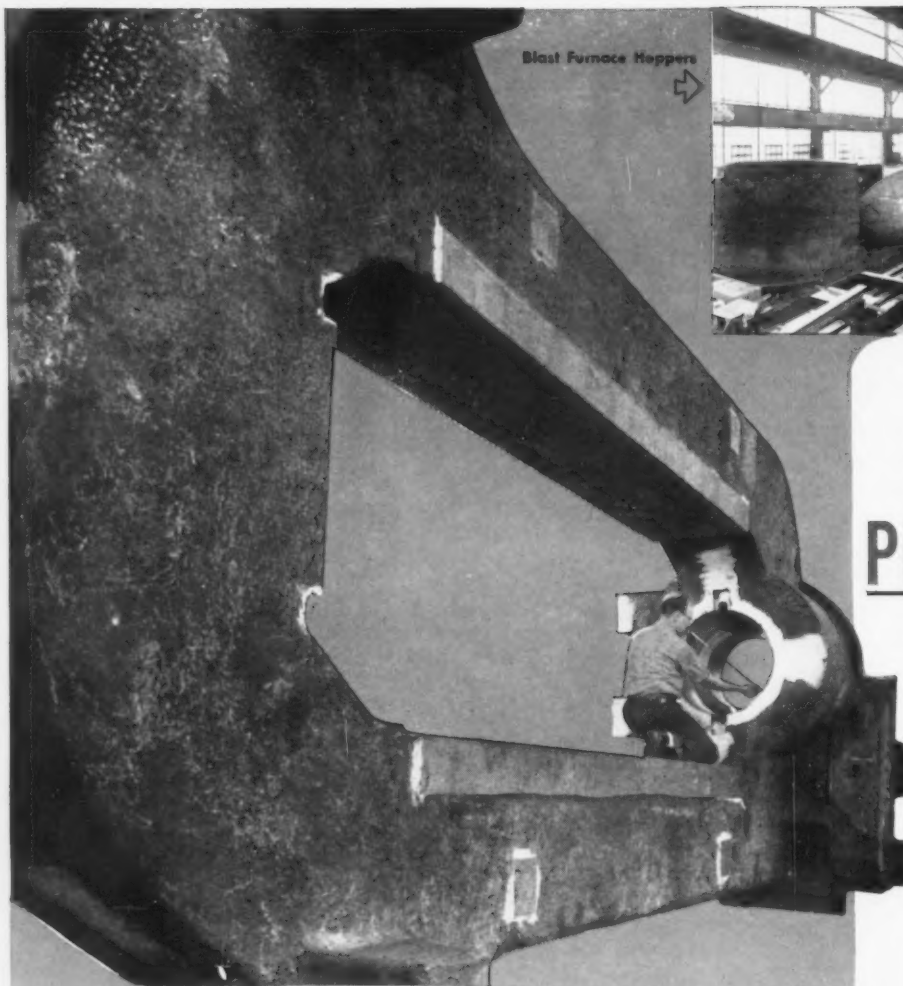
### PRICE SPIRAL

**Up and Up**—Climbing costs of doing business aren't something new, but there's little hope for any early end. And look for labor to capitalize on the trend for new wage and fringe demands. P. 73

### REFRACTORY SALES

**Western Firm Gains**—With sales 20 pct above last year's level, Kaiser Chemical isn't relaxing. It's spending \$11 million for expansion and plowing back money into research. P. 75





↑ 4 High Mill Housing

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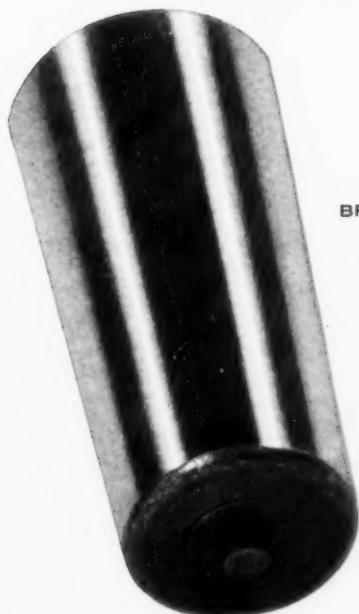




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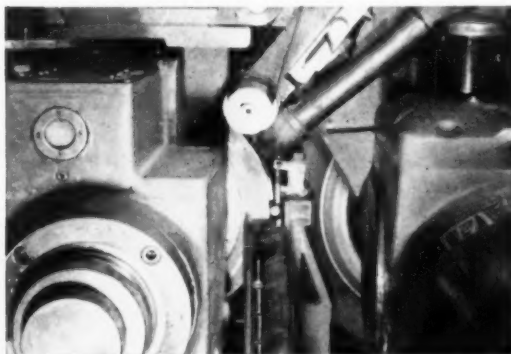
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Cylindrical parts are fed past a revolving Osborn Matic® Brush. Surface finishes are refined to low microinch readings, grinding burrs are removed and surface junctures blended to reduce stress concentrations.

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## Here's Why Armco ALUMINIZED STEEL Type 2 Gives Longer Life to Outdoor Products

Its aluminum coating outlasts the coating on commercial galvanized sheets 3 to 1 in the atmosphere

Both sides of new Armco ALUMINIZED STEEL® Type 2 are protected by a special hot-dip aluminum coating that seals out atmospheric corrosion. Fifteen-year tests (before commercial production was begun) offer strong evidence of its enduring protection.

They show that the aluminum coat-

ing on Armco ALUMINIZED STEEL Type 2 has at least three times the life of a standard zinc coating on commercial galvanized steel sheets in a mild industrial atmosphere.

### Costs less

Armco ALUMINIZED STEEL Type 2

costs from 29 to 45 per cent less than aluminum, thickness for thickness, depending on the aluminum alloy used for comparison. And since its greater strength usually permits lighter gages, these savings may be boosted nearly 20 per cent more. This economical steel also costs less than galvanized sheets that are to be given a field coat of paint. ALUMINIZED STEEL does not need paint.

### Stronger than aluminum

Comparison of Typical Properties Armco ALUMINIZED STEEL Type 2 and Aluminum

	ALUMINIZED Type 2	ALUMINUM					
		3003-H12 (1/4 Hard)	3003-H14 (1/2 Hard)	5052-H32 (1/4 Hard)	5052-H34 (1/2 Hard)	6061-T4 *	6061-T6 **
Tensile Strength, psi	54,000	15,000	17,000	34,000	37,000	35,000	45,000
Yield Strength, psi	40,000	13,000	14,000	26,000	21,000	21,000	40,000
Elongation % in 2"	22	12	9	12	8	22	12

\*Solution heat treated and naturally aged.

\*\*Solution heat treated and artificially aged.

Modulus of elasticity for steel—about 29,000,000 psi; for aluminum alloys—about 10,000,000 psi.

### Write for details

If your products are used outdoors, let us show you how Armco ALUMINIZED STEEL Type 2 can give them longer service life—at less cost. Just call the nearest Armco Sales Office, or write us at the address below.

## ARMCO STEEL CORPORATION

1427 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION



# Short Term Squalls— They'll Always Be With Us

One of our most tantalizing thoughts is that we may have done away with depressions. Or at least if we haven't gone that far we have been able to "control" business dips.

Both of these goals are great—if we can reach them. We are a long way from such pleasant accomplishments.

But we have gone far in doing away with anxiety and the chance of complete paralysis such as we had in 1893, 1907 and 1932. Call them built-in safeguards or whatever you want—we do have laws, patterns, emergency action and experience to fight sudden economic crises.

Part of this safety equipment is our continual worry over the health of the economy. As long as we retain this attitude the bumps won't be more than we can take. Another part is our Federal Reserve System. Then we have industry's five-year plans—free from the every-day hysteria that might scuttle well-laid plans.

All of this may tend to blind us to the short-term squalls that blow up from time to time. If we accept the fact that they are bound to occur and that they will pass, we will be in better shape to survive them without damage.

We are in a squall now. Call it the inventory

liquidation period. But note that it is hitting only certain segments of the economy. That is why we are able to absorb these separate—and at times serious—"corrections".

Soon we will be building autos fast and furiously. Part of this will be to fill the supply lines in case there is an auto strike. While the dealers' showrooms are being filled, steel, paint, aluminum, fabrics and glass will gain ground. Later if there is no strike the short squall of "too many cars" will cut production.

In 1959's first half, steel production will almost break its bounds. People who look for higher wages, higher prices—and a strike—will pile up inventory. Later there will be a slowing-down squall as this is worked off.

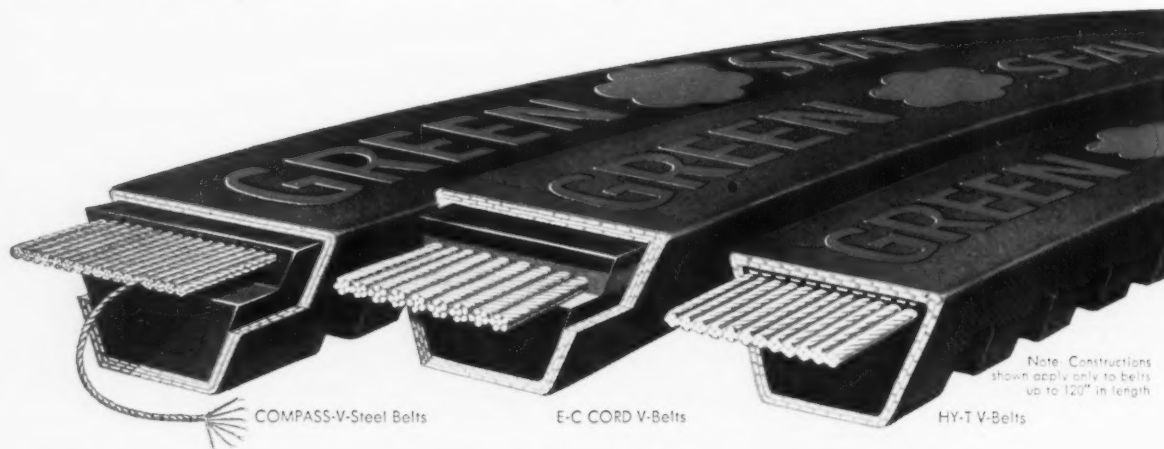
Surviving the short-term squalls will build the character and stamina needed to face the challenge of the 60's. New families, obsolescence, automation, geometric growth in transportation are but a few of the preventives of poor industrial health.

Should The Depression ever come, that too will be licked with all of us alive and kicking. So let's not worry too much about it. There is work to be done!

*Tom Campbell*

Editor-in-Chief

# Now—V-Belts with the Green Seal solve the major multiple drive problem



The Green Seal stands for true dimensional stability in V-belts. And with Green Seal dimensionally stable belts you can be sure that matched sets are truly matched and will stay matched—that mismatching (the biggest problem in belting multiple drives successfully) is a thing of the past.

The key to dimensional stability lies in the tension members of the belt. For many years, steel cables as developed by Goodyear were the only length stable load carriers, but now they have been joined by synthetic cords, thanks to the

amazing Triple-Tempered 3-T process.

The 3-T process is an exclusive method of tempering the cord with Tension, Temperature and Time for maximum strength and minimum change in dimensions. This assures no change in length during storage plus greatly increased shock- and stretch-resistance on the drive.

The end result is smoother, longer-running teams of belts that give you maximum, trouble-free, horsepower hours at minimum cost. What better reason for specifying V-belts with the Green Seal?

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## LETTERS FROM READERS

### Success In Business

**Sir**—Please send a reprint of the Benjamin F. Fairless article, "Success in Business Takes More Than Urge to Get Ahead."

The article was most informative and worthwhile and I'd like to see more of the same in your excellent publication. — C. B. Austin, Jr., Charles Palm & Co., Inc., Bloomfield, Conn.

**Sir**—Please send us six reprints of your article, "Success in Business Takes More Than Urge to Get Ahead," by Benjamin F. Fairless in your July 4 issue.

It is an excellent article and I certainly will appreciate the extra copies.—C. Hoehn, Jr., President, Superior Electrocast Foundry Co., S. San Francisco, Calif.

■ Copies are on the way.—Ed.

### Editorials

**Sir**—Your recent editorials have been even better than usual.

They sound so much en rapport to the poem by Kipling ("The Gods of the Copybook Headings") that I feel you must be cognizant of it, if not you should be.—A. G. Van Denburgh, Vice Pres., J. R. Quaid, Inc., New Orleans, La.

### Foamed Aluminum

**Sir**—I was very much interested in a Newsfront item in your June 27 issue entitled "Now—'Foamed' Aluminum!"

We would like very much to become better acquainted with the development of this foamed aluminum, and we would appreciate your advising whom we may contact with reference to its production and sale. —C. C. Travis, Travis-Applegate Co., Grand Rapids, Mich.

■ Write to the Bjorksten Research Laboratories, Inc., Madison, Wis.—Ed.

### Good Timing

**Sir**—Please send me three reprints or tear sheets of your article "How to Pick Executives" in the June 27 issue.

This was a very timely article, excellently written, and it will be a great benefit to me.—J. A. Pruessner, Mgr. of Equipment, Building and Utilities Maintenance, Sandusky Foundry & Machine Co., Sandusky, Ohio.

### Metalworking Dollar

**Sir**—We consider your article, "How to Get More for Your Metalworking Dollar", in your May 30 issue, excellent. Of particular interest were your comments on tolerances. They are so right! May we have two copies for future reference?—C. S. Davis, Research Engr., Aerophysics Development Corp., Santa Barbara, Calif.

■ Copies are on the way.—Ed.



"We're pouring our one millionth ton, you might at least tuck in your shirt."

## Low Tolerance for Strip?



You'll Love

**Somers**

Performance

With the installation of the first Accu-Ray Nuclear gauge ever employed in the non-ferrous industry, Somers is able to control the thickness of thinstrip to the hundred-thousandth even on production runs.

This is typical of the modern equipment and the careful quality control that enables Somers Brass to produce the one thinstrip job in ten that must meet exacting standards with absolute uniformity.

If you are now using or anticipate the need for thin gauge brass, nickel, copper and alloys with extremely close tolerances write for the Confidential Data Blank. There is no cost or obligation.



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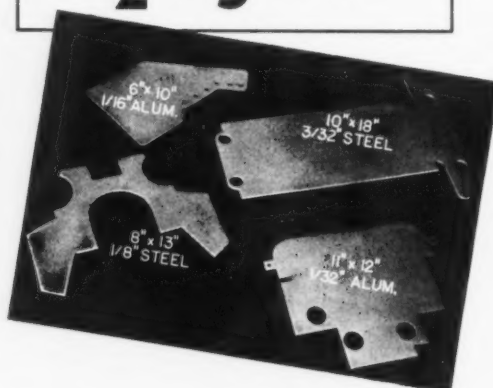
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THICKNESS	MINIMUM	MAXIMUM
1/32 STEEL	100,000	UNKNOWN
1/16 STEEL	100,000	UNKNOWN
3/32 STEEL	75,000	UNKNOWN
1/8 STEEL	50,000	UNKNOWN

MAXIMUM UNKNOWN AS DIES HAVE  
NEVER BEEN RUN TO DESTRUCTION

### MINIMUM PRODUCTION ON ALUMINUM AND SIMILAR METALS

THICKNESS	MINIMUM	MAXIMUM
1/16 ALUMINUM	125,000	UNKNOWN
3/32 ALUMINUM	100,000	UNKNOWN
1/8 ALUMINUM	75,000	UNKNOWN
5/32 ALUMINUM	50,000	UNKNOWN
3/16 ALUMINUM	40,000	UNKNOWN

MAXIMUM UNKNOWN AS DIES HAVE  
NEVER BEEN RUN TO DESTRUCTION

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OVER A QUARTER OF A CENTURY OF DIE MAKING SERVICE TO INDUSTRY

## FATIGUE CRACKS

### TCC on Labour

The credit line reads: "Outlook for Labour (sic), (By) Tom Campbell, (Editor-in-Chief of the American Iron Age)."

That perfectly proper "u" in "Labour" is the tip-off to our discerning friends at home and abroad that Tom's reputation as an authority on American labor has, at last, spread to the British Isles.

**The Lowdown**—So if you want to get the lowdown on the past, present, and future of the American labor movement, we'll look the other way while you read your copy of "The British Iron & Steel Fed-

eration Quarterly," July, 1957, issue. Of course, you readers of "The American Iron Age" should already be aware of Tom's penetrating observations on labor (particularly steel labor) in the States. His stories on the subject are as long as your arm, go back to the 1930's.

In this same issue of the British quarterly, you'll find mighty interesting reading in the articles by Benjamin F. Fairless, president, American Iron and Steel Institute, on "Looking into the Future," and Charles M. Parker, asst. vice-president, American Iron and Steel Institute, on "Technological Trends."

### Odes to Stainless

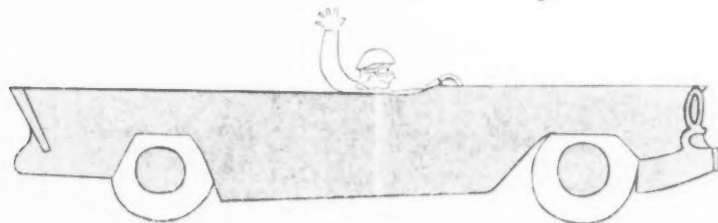
■ For the past six weeks we've been receiving, at the rate of one a week, a series of unsigned greeting cards.

Aside from being rather humor-

*I've got a hot rod now  
FOR REAL*



*the whole damn thing is...*



STAINLESS STEEL

ous, all have one thing in common: all refer to stainless steel.

Samples:

**Relax! Unbend! Heed love's appeal.**

**To your dent-proof heart of stainless steel.**

**Won't chip, won't crack, won't dent, won't peel**

**You weather the years like stainless steel. . . . Happy Birthday!**

With a little detective work we tracked them down to the people who do publicity for the stainless steel producers, found you can actually buy all six wherever Hand Print Cards, Inc., are sold. For our favorite, see cut.

**PROBLEM:**

**Finish  
JATO cases  
inside and  
out...  
automatically**



**ANSWER:**

CALL IN

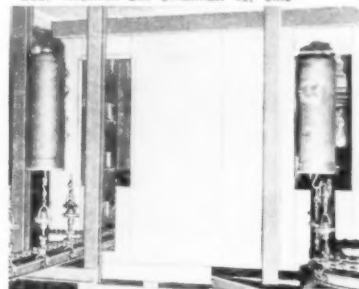
**Cincinnati**

JATO cases at Phillips Petroleum move continuously from cleaning through painting to the bake oven . . . hang vertically on indexing conveyor to rotate as they are painted—inside and out—in just two automatic operations.

Let CINCINNATI expedite your cleaning and finishing. For free survey, write today!

**CINCINNATI CLEANING and FINISHING  
MACHINERY COMPANY**

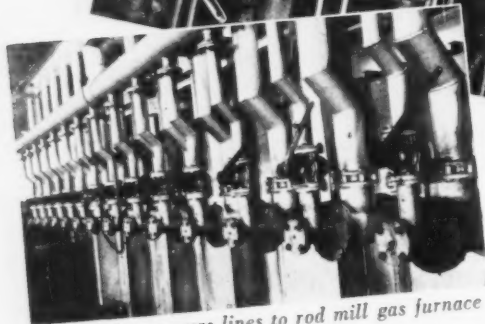
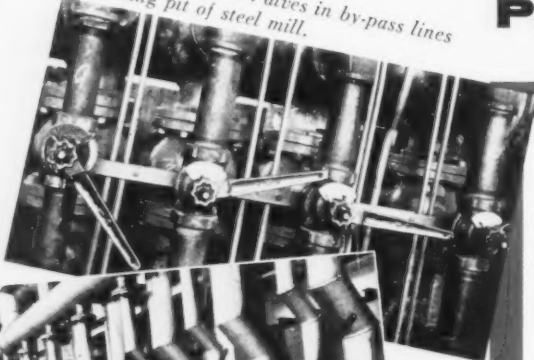
2017 Hazeman St., Cincinnati 41, Ohio



# 14 reasons why you get superior performance from **acf**

## **LUBRICATED PLUG VALVES**

*acf Diamond Port Valves in by-pass lines  
in soaking pit of steel mill.*



*acf Valves on gas lines to rod mill gas furnace  
in a Pennsylvania steel mill.*

Study this list of design and operating advantages and you will see why **acf** Lubricated Plug Valves are meeting the requirements of thousands of plants throughout the nation. **acf** Valves permit your piping system to handle fluids with maximum efficiency at minimum cost in time, labor and power. Protected seating and sealing surfaces, leak-proof head seal, non-wedging plug reduce "down time" and maintenance to a minimum. For higher efficiency—longer life—lower cost—specify **acf** Lubricated Plug Valves.

**acf** Valves are available in semi-steel, carbon steel, bronze and aluminum.

Sizes: 1/2" to 24".

Pressures: semi-steel: 175 lbs. WOG to 500 lbs. WOG.

Carbon steel: ASA 150 and ASA 300.

*Representatives in all principal cities.*

Ask your Industrial or Mill Supply Distributor for **acf** Valves.

1. Wide Port—Maximum Flow Efficiency
2. Full Pipe Area
3. Patented Head Gasket made of tough self-lubricating Teflon\*
4. Perfectly lubricated (gun or stick)
5. Tight against head leaks under any line pressure
6. Minimum number of parts
7. Lubricant protects against wear and corrosion
8. No exposed seating surfaces
9. Quick opening
10. Installed in any position
11. Compact: fits into small space; gate valve face-to-face dimensions where needed
12. Non-wedging cylindrical plug provides easy operation
13. Easily dismantled for repairs
14. Lubricant release to prevent contamination

\*DuPont's tetrafluoroethylene resin.

5704

### **W-K-M**

DIVISION OF **ACF INDUSTRIES**  
INCORPORATED

PLANT: MISSOURI CITY, TEXAS  
MAILING ADDRESS: P. O. BOX 2117, HOUSTON, TEXAS

Write Dept. T-801 for new  
ACF Valve Catalog 400.



MANUFACTURERS OF  **W-K-M** GATE VALVES  **ACF** LUBRICATED PLUG VALVES  **KEY-KAST** ALLOY STEEL PIPING FITTINGS  **KEY** RETURN BENDS AND FITTINGS



## EXHIBITS, MEETINGS

**Packaging & Handling Show**—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22.)

**Atom Fair '57**—Oct. 28-31, New York. (Atomic Industrial Forum, 3 E. 54th St., N. Y. 22.)

**Metal Show** — Nov. 2-8, Chicago, (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

### AUGUST

**Society of Automotive Engineers**—West Coast meeting, Aug. 12-15, Olympic Hotel, Seattle. Society headquarters, 485 Lexington Ave., New York.

**American Institute of Electrical Engineers** — Pacific general meeting, Aug. 28-30, Chinook Hotel, Yakima, Wash. Society headquarters, 33 W. 39th St., New York.

### SEPTEMBER

**National Metal Trades Assn.**—Eastern plant management conference, Sept. 8-11, Essex - Sussex Hotel, Spring Lake, N. J. Society headquarters, 337 W. Madison St., Chicago.

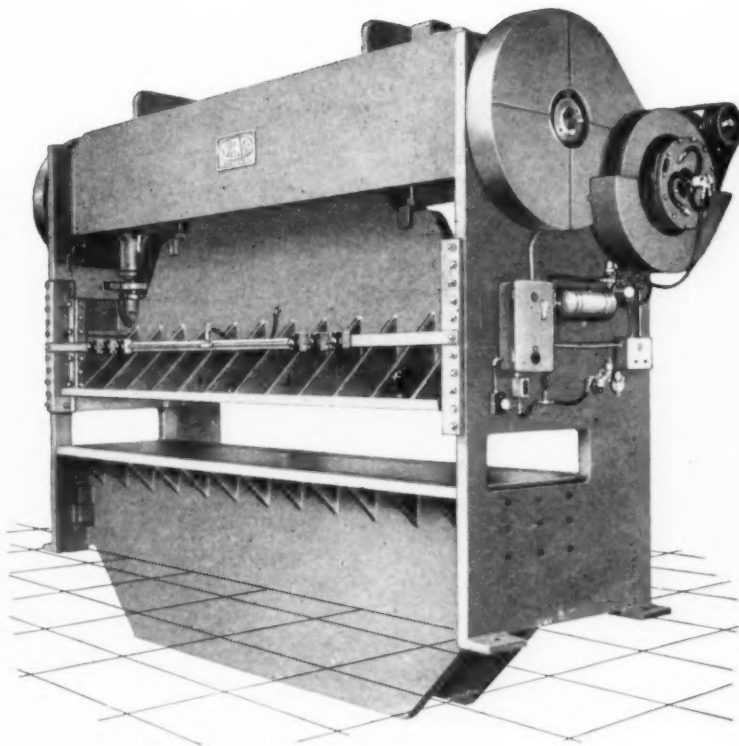
**American Mining Congress**—Metal mining and industrial minerals convention, Sept. 9-11, Hotels Utah & Newhouse, Salt Lake City, Utah. Society headquarters, 1200 18th St., Washington, D. C.

**Instrument Society of America**—12th annual instrument-automation conference and exhibit, Sept. 9-13, Cleveland Auditorium, Cleveland. Society headquarters, 313 Sixth Ave., Pittsburgh.

**National Petroleum Assn.**—Annual meeting, Sept. 11-13, Traymore Hotel, Atlantic City. Society headquarters, 958 Munsey Bldg., Washington.

**Marking Device Assn.** — National meeting, Sept. 19-20, Roosevelt

(Continued on P. 16)



## PRESSES

STRAIGHT-SIDE TYPE

*large die area  
capacities up to 400 tons*

This is a typical model of CHICAGO straight-side-type presses used for multiple punching, notching, and trimming operations. This press with a die area of 48 inches by 198 inches has a capacity of 200 tons.

*Complete recommendations for any job on request.*

0074



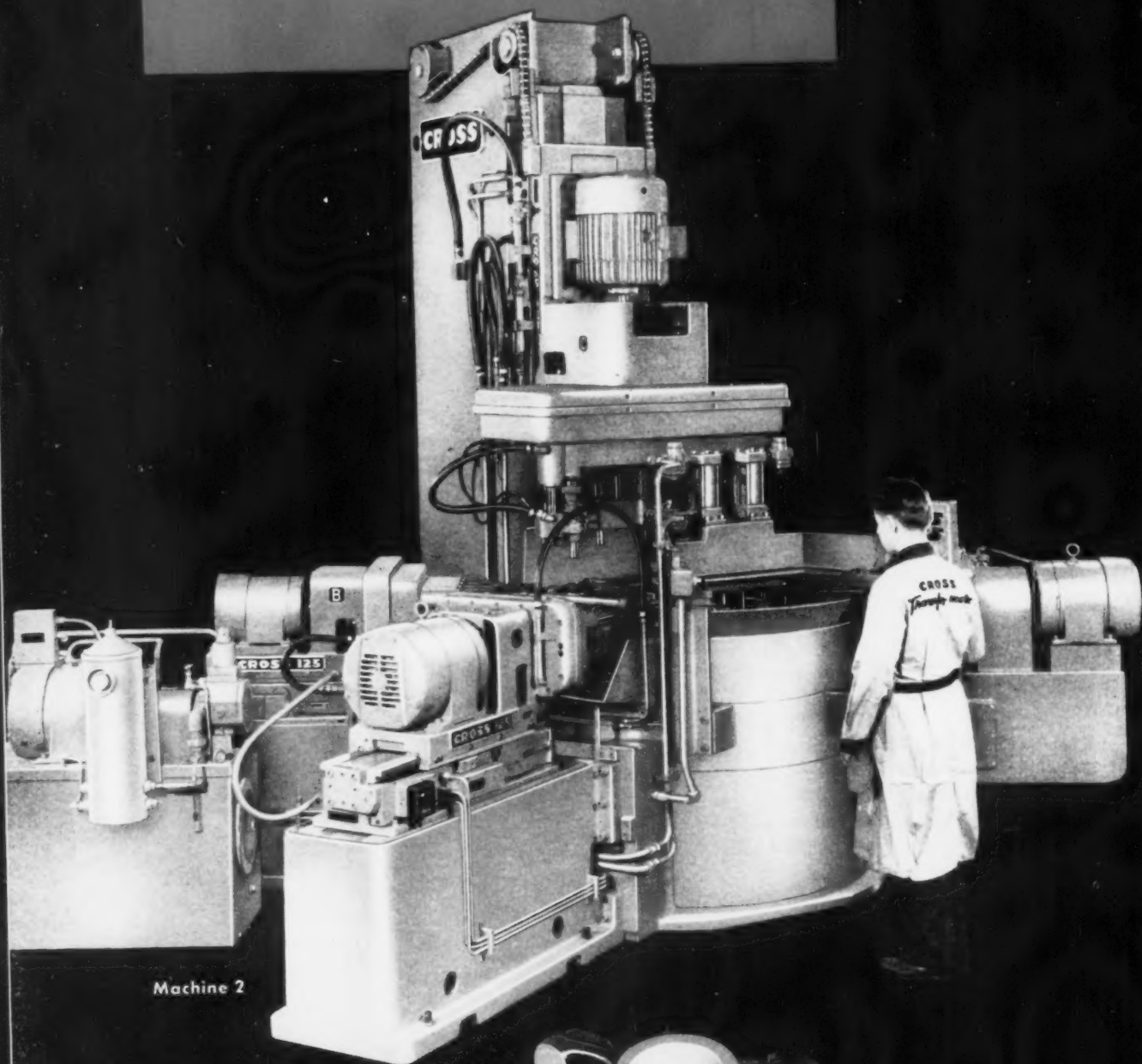
Press Brakes • Straight-Side-Type Presses • Press Brake Dies  
Hand and Power Bending Brakes • Special Metal-Forming Machines

## DREIS & KRUMP

MANUFACTURING CO.

South Loomis Boulevard, Chicago 36, Illinois

# Two Dial Type Machines Process Valve Rocker Arms



Machine 2

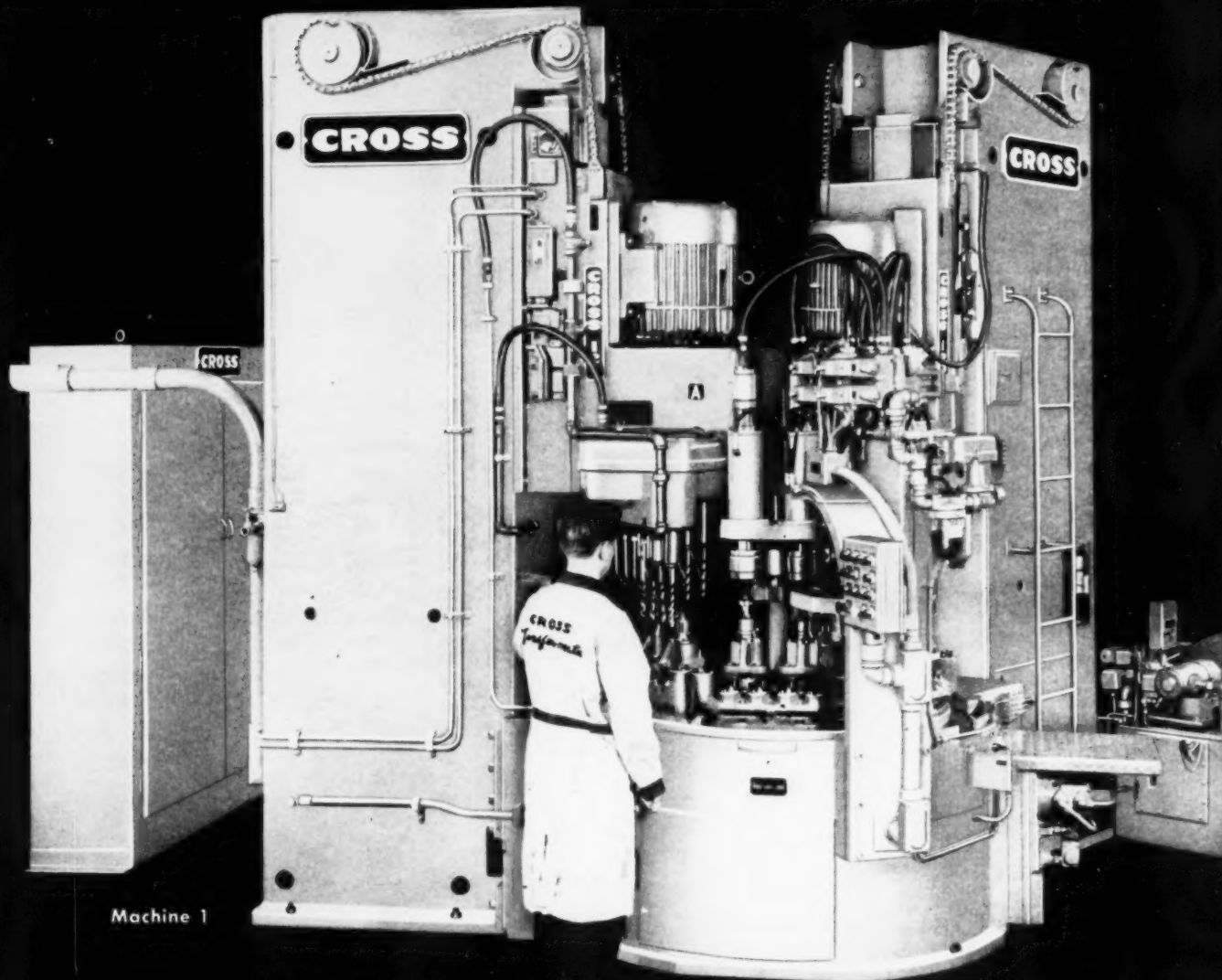


Established 1898

THE **CROSS** CO.  
*First in Automation*

PARK GROVE STATION • DETROIT 5, MICHIGAN

## *More Specials by Cross*



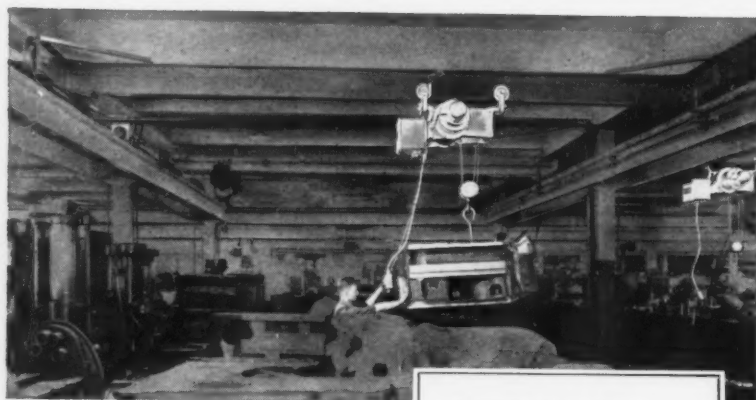
Machine 1

- ★ 800 pieces per hour at 100% efficiency.
- ★ Four parts machined in each station.
- ★ Machine 1 drills and reams rocker shaft hole; forms oil groove; drills one oil hole. Machine 2 drills, chamfers and taps adjusting screw hole; drills, counterdrills and spotfaces second oil hole.
- ★ Push button controlled power wrenches operate fixture clamps.
- ★ Cross "building block" construction provides flexibility for part design changes.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Other features: Construction to JIC standards; hardened and ground ways; hydraulic feed and rapid traverse for drilling and reaming; individual lead screw feed for tapping; automatic lubrication; pre-set tooling throughout.

## SHEPARD NILES HOISTS

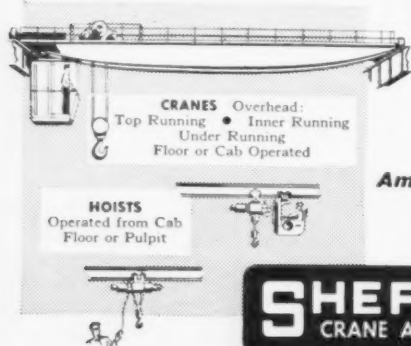
# LIFT LOADS

long after they're written off



LOOK FOR YEARS of dependable, trouble-free lifting when you invest in a Shepard Niles Hoist. Because Shepard Niles builds hoists that go on lifting long after you've written their original cost off. This is the kind of performance you expect and get with a Shepard Niles Hoist.

Investigate the complete line of Shepard Niles Hoists . . . choose from medium and heavy capacities with slow, medium or fast speeds. Built for cycle duty, heavy intermittent duty, medium duty and light-occasional service. Short to long lifts, standard or close headroom, manual or magnetic controls.



• Write for latest Bulletin showing Shepard Niles Hoists . . . and request our representative to call.

**America's Most Complete Line  
of Cranes and Hoists  
Since 1903**

## SHEPARD NILES

CRANE AND HOIST CORPORATION

1483 Schuyler Ave., Montour Falls, N.Y.

## EXHIBITS, MEETINGS

Continued from P. 13

Hotel, New Orleans. Society headquarters, 912 Chicago Ave., Evanston, Ill.

**Steel Founders' Society of America**—Fall meeting, Sept. 23-24, The Homestead, Hot Springs, Va. Society headquarters, 606 Terminal Tower, Cleveland.

**The American Society of Mechanical Engineers**—Fall meeting, Sept. 23-25, Statler Hotel, Hartford, Conn. Society headquarters, 1010 Empire Bldg., Pittsburgh.

**Standards Engineers Society**—Sixth annual meeting on standardization—economy through application Sept. 23-25, Hotel Commodore, New York. Society headquarters, P. O. Box 281, Camden, N. J.

**Assn. of Iron & Steel Engineers**—Annual convention, Sept. 23-26, Penn Sheraton Hotel, Pittsburgh. Society headquarters, 1010 Empire Bldg., Pittsburgh.

**American Hot Dip Galvanizers Assn.**—Semi-annual meeting, Sept. 26-27, Netherland - Hilton Hotel, Cincinnati. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

## OCTOBER

**The Electrochemical Society**—Semi-annual meeting, Oct. 6-10, Statler Hotel, Buffalo. Society headquarters, 216 W. 102nd St., New York.

**American Institute of Steel Construction**—35th annual meeting, Oct. 6-11, Hotel del Coronado, Calif. Society headquarters, 101 Park Ave., New York.

**American Society of Lubrication Engineers**—Fourth conference, Oct. 7-9, Royal York Hotel, Toronto, Ont., Canada. Society headquarters, 84 E. Randolph St., Chicago.

**Committee on Vacuum Techniques**—Fourth annual symposium on high vacuum technology, Oct. 9-11, Hotel Somerset, Boston. Society headquarters, Box 1282, Boston.





## *Memo to a Man of "Parts"*

The number of different parts made from Roebling High Carbon Specialties, Flat Wire and Spring Steel are close to countless.

Some things you can count on, though, are the consistent dimensional and mechanical uniformity you get with any Roebling High Carbon Specialty. They are the qualities that contribute to speeding *your* production and cutting *your* costs.

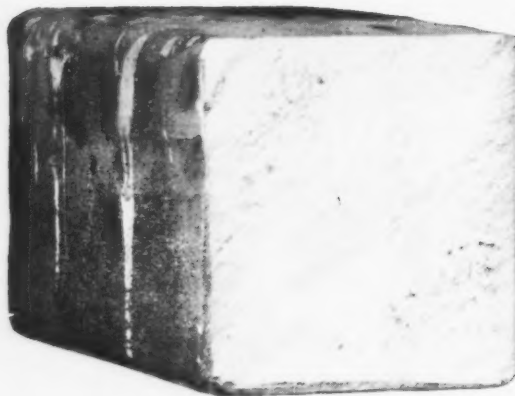
They are high qualities that make for high values. Next time you need flat wire or spring steel, specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

**ROEBLING**

Branch Offices in Principal Cities  
Subsidiary of The Colorado Fuel and Iron Corporation



*Roebling...Your Product is Better for it*



# POROSITY

## CAN'T HIDE BEHIND THIS SQUARE CUT

### -WHEN YOU DIVIDE YOUR FORGING STOCK WITH A "BUFFALO" BILLET SHEAR

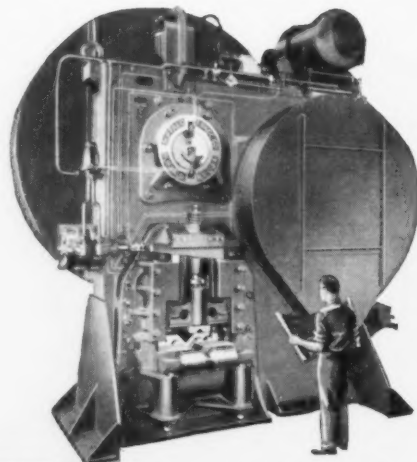
The time to detect porosity or "pipes" in your stock is *before* the forging, not afterwards, and that's one of many ways "Buffalo" Billet Shears save money.

The knives penetrate only  $\frac{3}{16}$ ", localizing a sharp, vertical fracture — perfectly square, without the "smearing" present on sawed or burned faces. This enhances visual inspection and prevents many a forging "reject".

Other savings with "Buffalo" Billet Shears are high cutting speeds — elimination of gas and burner expense — maintenance of uniform weight in billets — and minimum operating cost over the years.

11 sizes are ready to meet your needs, the smallest handling  $2\frac{1}{4}$ " rounds or 2" squares at 30 strokes per minute — the largest handling 10" rounds or 9" squares at 6 strokes per minute. All have the "Q" Factor\* of engineering and workmanship that provides trouble-free satisfaction and long life in every "Buffalo" product. Write for Bulletin 3295-C and see how these Quality features can save you money.

*\*The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.*



**540 PER HOUR!**

That's the output of a "Buffalo" No. 15 Billet Shear dividing 7" square stock in a large plant. Machine has automatic feed table and back gage. Above is a No. 17 Shear, largest in the line.



## BUFFALO FORGE COMPANY

492 Broadway • Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

**Here's how  
to cut  
gear hobbing  
costs:**

*Specify* **ILLINITE<sup>®</sup>**  
**CERTIFIED**

## **UNGROUND HOBS**

There's no need to pay a premium for hob tolerance you don't need! Illinite Certified Unground Hobs provide all the tolerance necessary for cutting most gears, particularly if they are processed for further finishing operations . . . and cost much less than Class A or B ground hobs.

For visual proof of accuracy, each Illinite Unground Hob is accompanied by an electrically recorded Toolgraph<sup>®</sup> Chart—your certificate of accuracy and quality offered by Illinite research.

Find out all about Illinite Certified Unground Hobs. Read the informative booklet illustrated below which lists certified unground hob tolerances as well as Class A and B hob tolerances for comparison.

*ILLINITE Standard Hobs are available from your local Distributor's stock . . . call him today.*

### **SEND FOR**

#### **CERTIFIED UNGROUND HOBS**

Lists tolerance data for Certified Unground Hobs as well as Class A and B tolerances for comparison.

#### **RIGHT AND WRONG OF MODERN HOB SHARPENING**

Contains helpful information on proper hob sharpening methods. Helps insure maximum tool life.



**ILLINITE<sup>®</sup>**  
**DIVISION OF ILLINOIS TOOL WORKS**

2501 N. Keeler Ave., Chicago 39, Illinois

*Metal Cutting Tools*



designed  
with...

**beryllium**

**copper**

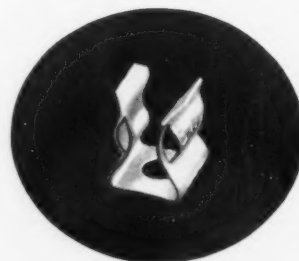
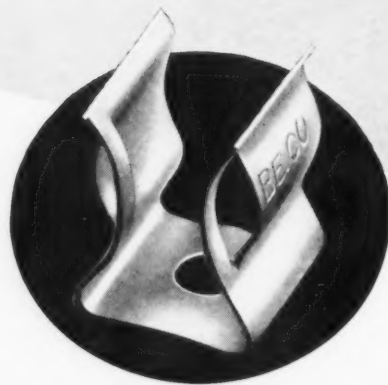
## FUSE CLIPS HAVE GREATER GRIP STRENGTH--WITHSTAND HIGH CURRENTS WITHOUT ANNEALING

Because of the high tensile strength of the beryllium copper alloy, "BERYLCO" 165, clips of this material grasp the fuse cap up to 1000% tighter than clips made of other copper alloys.

In comparison, the alloy provides lower contact resistance and much higher conductivity than other possible clip materials, such as phosphor bronze.

Beryllium copper fuse clips greatly reduce contact point heating. They will not buckle or anneal at high temperatures. Clips of this alloy are immune to mechanical fatigue from rough and severe usage arising from the continuous insertion and extraction of fuses in the fuse clip.

THE BERYLLIUM CORPORATION  
READING / PENNSYLVANIA



### TECHNICAL BULLETIN NO. 38

describing the design advantages of "BERYLCO" beryllium copper in fuse clips manufactured by Littelfuse, Inc., Des Plaines, Ill., is available upon request. Write for your free copy now.

### PHYSICAL PROPERTIES OF "BERYLCO" 165 STRIP

Specific Gravity	8.26
Density, lb. per cu in	0.298
Melting range, °F	1600-1800
Thermal expansion coefficient, per °C, 20° to 200°	0.0000170
Thermal expansion coefficient, per °F, 68° to 392°	0.0000094
Thermal conductivity, btu/sq ft/in/hr/°F at 68 F	750-900*
cal/sq cm/cm/sec/°C at 20°C	0.26-0.31*
Electrical conductivity, IACS % at 20°C	22-30*
Electrical resistivity, microhm cm at 20°C	7.8-5.7*
*Heat treated	

### BERYLLIUM COPPER ALLOYS HAVE RESISTANCE TO:

WEAR

FATIGUE

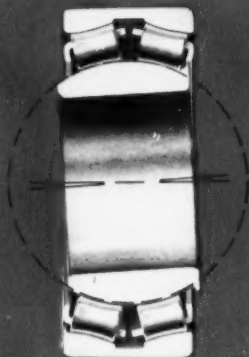
CORROSION

MAGNETISM

SPARKING



# self-aligning ... CAN'T BIND



**HOW SELF-ALIGNMENT WORKS.** Spherical inner ring, free to align in any direction, assures full load capacity regardless of shaft deflection or support misalignment.

## Husky bearings in husky housings adjust immediately in any direction

When high-impact loads deal out punishment, shaft deflection may spell a quick finish for ordinary bearings. But this rugged Link-Belt bearing is self-aligning . . . won't "pinch" or bind when misaligned.

Complete protection is provided by effective seals which block entrance of dirt, escape of

lubricant. Durable housing—machined as two perfectly matched parts provides easy installation without shims or alignment rings.

Get full data on Link-Belt's complete bearing line from Book 2550. Ask any of 40 Link-Belt offices or one of our authorized stock-carrying distributors.

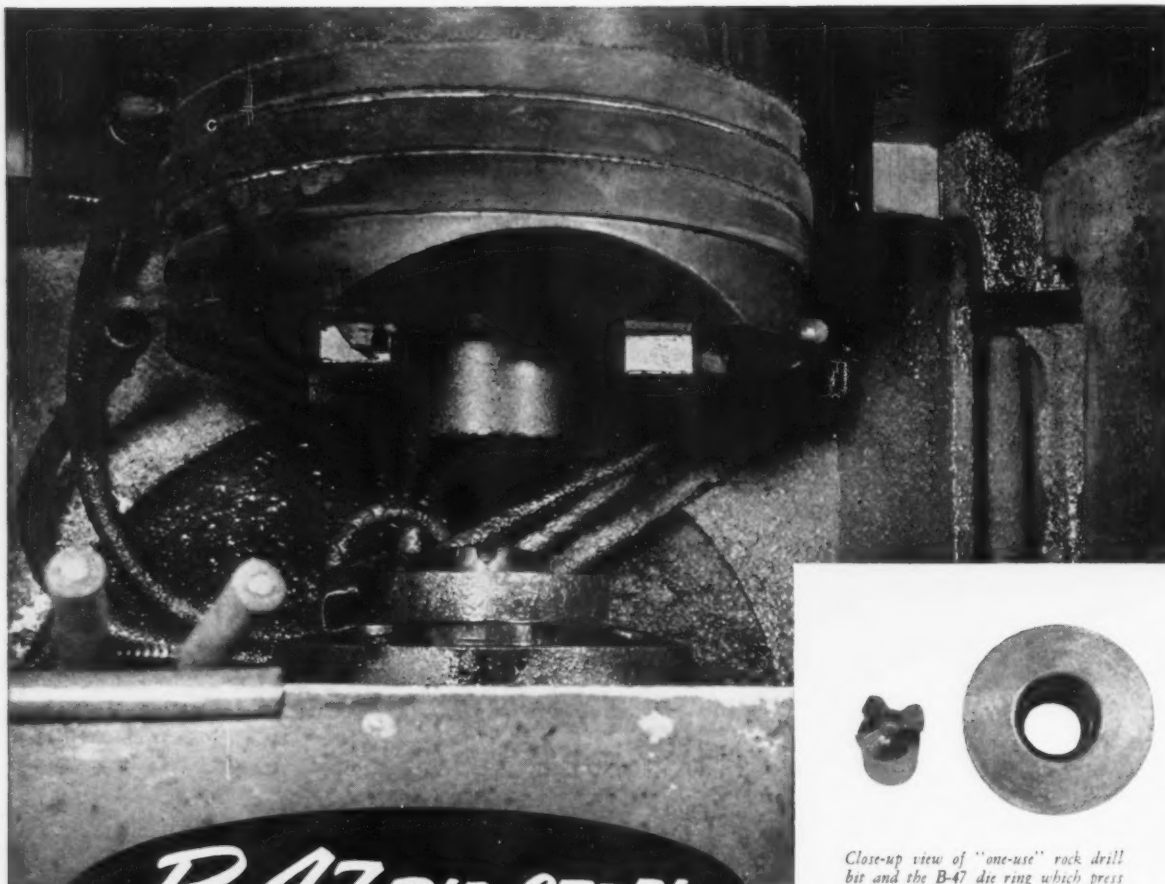


Series 6808, 6900, 7800, 7900 roller bearings have internationally standardized boundary dimensions.

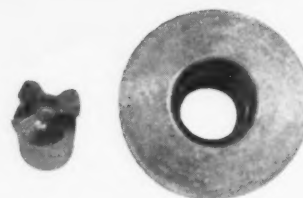
**LINK BELT**  
self-aligning ball and roller bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

14,441



**B-47 DIE STEEL**



Close-up view of "one-use" rock drill bit and the B-47 die ring which press forges it.

## INCREASED ROCK DRILL BIT PRODUCTION **330%**



### Write for **BLUE SHEET on B-47**

This concise four-page folder gives all needed handling and shop treatment details on B-47. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. Ask for your copy.

**ADDRESS DEPT. A-92**

A midwestern company increased their production of rock drill bits from 1500-3000 per die ring to a consistent total of more than 10,000 bits by switching to Allegheny Ludlum's B-47 die steel.

But of even greater importance, they claim, is the dependability of B-47:

"The less breakdowns we have, the less die changes we must make and the better production we get. Also, we are able to plan our production on the basis of being sure of the reliability of our dies."

Continued high production is necessary to make these special "one-use" bits com-

petitive in today's market. B-47 practically eliminates unscheduled downtime caused by die failure.

A-L's B-47 is a tough hot work steel. It has excellent resistance to shock and abrasion at elevated temperatures. Also, it is especially good for those applications which require ruggedness at relatively high hardnesses.

Check your A-L representative today about Allegheny Ludlum's complete line of tool and die steels—a grade for every job. **Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh, Pa.**

For nearest representative, consult Yellow Section of your telephone book.

For complete **MODERN** Tooling, call  
**Allegheny Ludlum**



WSW 6847



*Steelmakers who blow with Oxygen need...*

## VANCORAM HIGH CARBON FERROCHROMIUM

Like most economy-minded manufacturers, you've probably turned to oxygen in the melting of your stainless and heat-resisting steels to effect major time, labor and raw materials savings.

That's where Vancoram High Carbon Ferrochromium Alloys come in. They're naturals for added savings when they're put to work with modern-day melting

equipment! They give you the most for the least, with no sacrifice in quality.

Get to know these Vancoram Alloys. They're especially adapted for stainless melting, and they are the product of Vanadium Corporation's unceasing efforts to develop better and lower cost high carbon ferrochromium alloys. Your VCA representative will give you the full particulars.

### 3 POPULAR VANCORAM HIGH CARBON FERROCHROMIUM ALLOYS.

	Chromium	Carbon	Silicon
Standard High Carbon	66/70%	4/6%	2% max.
Ferrochromium "63"	60/65% app.	3.5/5.0%	2/4.5%
Ferrochromium "55"*	50/60%	8% app.	5% max.
*Sulphur .03% max.			



**VANADIUM  
CORPORATION OF AMERICA**

420 Lexington Avenue, New York 17, N. Y.  
Chicago • Cleveland • Detroit • Pittsburgh  
*Producers of alloys, metals and chemicals*



Pickling Department, Wheatland Tube Company, Wheatland, Pa., producers of quality steel pipe and tubing. Monel alloy tie-rods keep wood tanks tight; acid loss to a minimum.

## Third time around for a Monel tie-rod ...and take-up threads still sound!

This man is tightening tie-rods on a pickling tank at the Wheatland Tube Company. They're Monel® nickel-copper alloy tie-rods. Many have outlasted two tanks and are now keeping their *third* tank tight... leak-free!

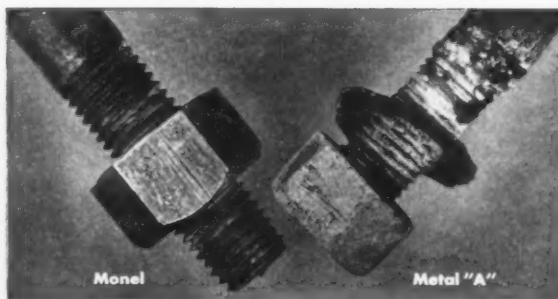
These tanks average four years' service. That means many of these Monel alloy tie-rods have lasted twelve years or more!

### You save acid . . . save money when tanks stay tight

You can keep tanks tight with Monel alloy tie-rods. Monel alloy does not dezincify. Take-up threads stay *strong*. All *sound* metal. They hold up under tensions developed by tightening and by swelling timber. You can depend on that!

You can also count on the same dependability from other Monel pickling equipment. Chains, eyebars, pickle pins, and pipe, for example.

And this wrought Monel can be fabricated to any practical design. It's easily welded, too.



Look at this evidence that Monel threads stay sound. When you need take-up thread, you have it, on Monel tie-rods.

\* \* \*

### Pickling equipment suggestions available

A 32-page Inco booklet, "Equipping the Pickle House for Greater Production at Lower Cost", tells you how to take advantage of Monel in *your* pickling department. Filled with illustrations and performance information. Write for it today.

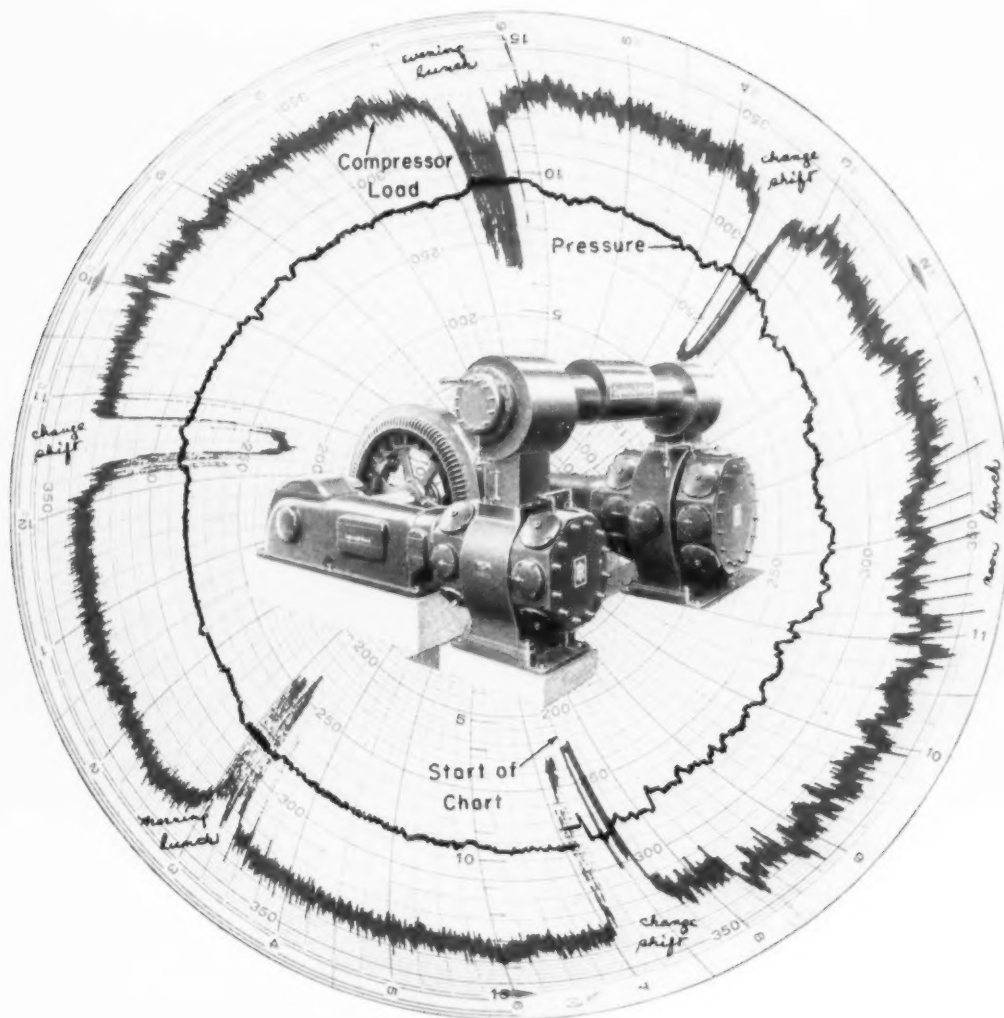
\*Registered Trademark

**THE INTERNATIONAL NICKEL COMPANY, INC.**  
67 Wall Street  
New York 5, N. Y.



**Monel...for proved pickling life**





## AROUND THE CLOCK with an Ingersoll-Rand PRE Compressor

Heavy 24-hour loading like this is all in a day's work at Caterpillar Tractor Co.

An air compressor doesn't punch a time clock. But the 24-hour pressure-capacity chart shown above gives an even better record of its actual, on-the-job performance at Caterpillar Tractor Co., Peoria, Ill.

This chart was taken on a nine-year-old PRE compressor supplying 3330 cfm at 95 psi for general plant air. Except for a slight "breather" during changing of shifts, this heavy-duty compressor is called upon to deliver full rated capacity virtually 24 hours a day — month after month, year after year.

This compressor is one of eight PREs (total capacity 24,640 cfm) in round-the-clock service

at the Caterpillar plant. The first PRE unit was installed here in 1927 and, like all the rest, is still giving efficient, dependable performance under full load conditions.

For proved dependability like this, in continuous heavy-duty service, it pays to specify Ingersoll-Rand compressors. Ask your I-R representative to give you the complete story.

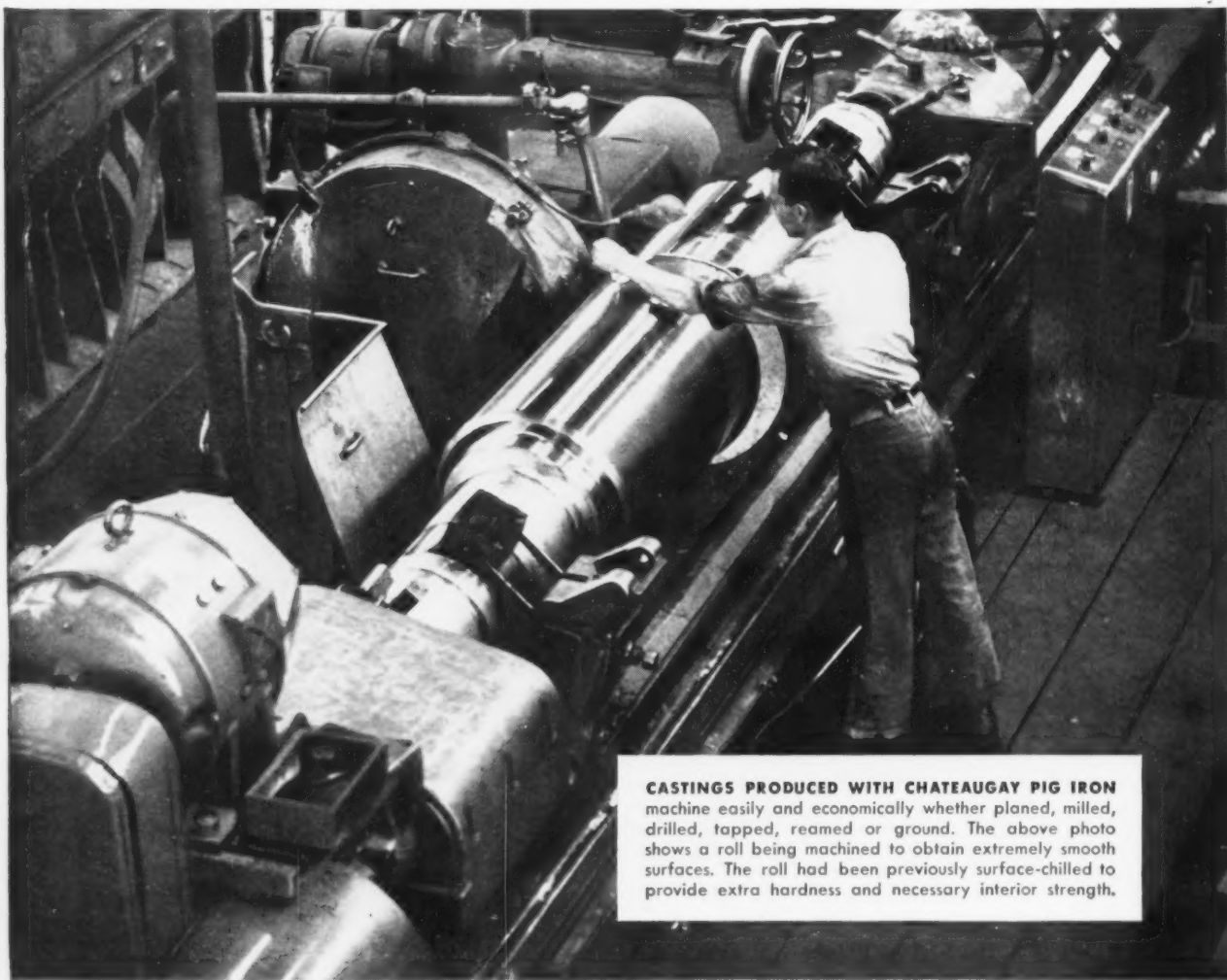
PRE compressors, 400 to 3000 hp, use I-R Channel Valves



**Ingersoll-Rand**  
1-567  
11 Broadway, New York 4, N. Y.

COMPRESSORS • GAS AND DIESEL ENGINES • ROCK DRILLS • PUMPS • TURBO-BLOWERS • AIR AND ELECTRIC TOOLS

*Exclusive Chemistry of Chateaugay Pig Iron*  
**HELPS FOUNDRYMEN MEET EXACTING**



**CASTINGS PRODUCED WITH CHATEAUGAY PIG IRON** machine easily and economically whether planed, milled, drilled, tapped, reamed or ground. The above photo shows a roll being machined to obtain extremely smooth surfaces. The roll had been previously surface-chilled to provide extra hardness and necessary interior strength.

**REPUBLIC**



*World's Widest Range of Standard Steels*

# REQUIREMENTS

For more than 50 years, foundrymen have used Republic Chateaugay Pig Iron to help them lick the tough casting jobs. They know Chateaugay's properties and characteristics are unequalled by any domestic pig iron. They also know that Chateaugay can be depended upon to meet the most exacting casting requirements.

The rolls used in the manufacture of paper, plastics, rubber, metals of all kinds, steel, copper, brass, aluminum, even breakfast cereals, are a good example of how Chateaugay lives up to its reputation.

Foundries producing these rolls have found Chateaugay the ideal pig iron to use in meeting the demands for hard, wear-resisting surfaces; for strength; for heat-resistance; for machinability.

One foundryman put it this way: "Chateaugay is indispensable in this application because of its finer graphite structure and grain refinement. The exclusive inherent chemistry of Chateaugay tends to nucleate the fine graphite flakes, producing a finer, condensed grain structure that gives the rolls increased strength and wear-resistance."

This fine dense grain structure also provides excellent and economical machinability and reduces scrap loss to an absolute minimum.

Chateaugay offers other superior characteristics which make it ideal for a wide variety of casting applications. It is an exceptionally fluid iron—cools evenly—fills adjoining light and heavy sections completely—produces tough, sound castings accurate to patterns and shapes.

A Republic Pig Iron Metallurgist will be glad to show you how the advantages of Chateaugay, the low-phosphorus, copper-free Pig Iron, can be applied to your production. How the year-in, year-out uniform chemistry of Chateaugay can help you produce consistently high quality castings. Mail the coupon today. There's no obligation.

# STEEL

*and Steel Products*

## MEETS LIFTING REQUIREMENTS

—Republic Chain Slings provide a safe method of lifting heavy and hard-to-manage materials. This new catalog contains complete information and specifications on Republic Chain Slings, Attachments and Accessories. Tells you how to use slings properly to obtain maximum life...how to store...how to inspect...how to order. Send the coupon for your copy.

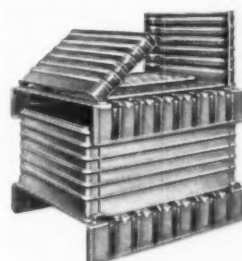


## MEETS STRENGTH REQUIREMENTS TO WITHSTAND ENORMOUS WEIGHTS

—Republic Wedge-Lock Steel Shelving is specifically designed for high stacking of such heavy items as castings, dies, tools, etc. Joints actually get tighter as weight increases. There's no distortion or instability. Wedge-Lock Steel Shelving also provides maximum loading in minimum floor space and assembles quickly and easily. Send coupon for more facts.

## MEETS STRONG CONSTRUCTION REQUIREMENTS

—Republic Materials Handling Equipment assures long, efficient service at lowest per-year cost. Illustrated is the PB-127 Collapsible Box, ideally suited to shipping castings and other heavy items. It is designed for heavy-duty service. It can be tiered when loaded or empty, collapsed or set up. All parts are permanently attached. Offers up to 66% saving in storage space. Write for facts.



## REPUBLIC STEEL CORPORATION

Dept. C-2919

3104 East 45th Street, Cleveland 27, Ohio

☐ Please have a Pig Iron Metallurgist call.

Send more information on:

☐ Chain Sling Catalog    ☐ Wedge-Lock Steel Shelving

☐ Collapsible Boxes

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



**"...way ahead of anything we have used.."**

**Here's what Federal Malleable  
thinks about the new HA "PAYLOADER":**

It has a bigger bucket capacity, yet its short turning radius and maneuverability has been retained. The 40" bucket roll-back at ground level is a big improvement in getting bigger loads into the bucket and carrying them in a low, close and more stable position. The torque converter drive also is a great feature as it makes operating the HA simpler and faster, and cushions the entire drive train.

"Our entire operation is dependent on the fast handling we get from our 'PAYLOADER' units and, so far, they haven't let us down," says N. N. Amrhein, Assistant General Manager at Federal Malleable of the Model HA tractor-shovel. "For all the good service they've given us, we can't afford to take a chance on anything less reliable."

Producers of castings since 1902 in Milwaukee, Wis., Federal Malleable has used "PAYLOADER" tractor-shovels as a vital part of their sand preparation system for 10 years. Four HA units are used at present "to scoop up the sand and castings after the daily pour and carry them to the oscillating conveyor. They also pick up reprocessed sand and deliver it to the molding stations."

Smallest of the "PAYLOADER" line, the Model HA has a 2,000 lb. carrying capacity. Operating features include rear wheel steering, one-lever bucket control, two speeds in either direction, and these optional attachments: Fork lift, castings bucket, pick-up sweeper and castered scrap hoppers. Call your nearby Distributor for a demonstration on what a Model HA or larger "PAYLOADER" can do to speed up your handling duties.

**THE FRANK G. HOUGH CO.**

733 Sunnyside Ave., Libertyville, Ill.

Send more "PAYLOADER" information on:

- ☐ Model HA (2,000 lb. carry capacity)  
☐ Larger models (up to 9,000 lb. carry capacity)

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

114



**PAYLOADER®**

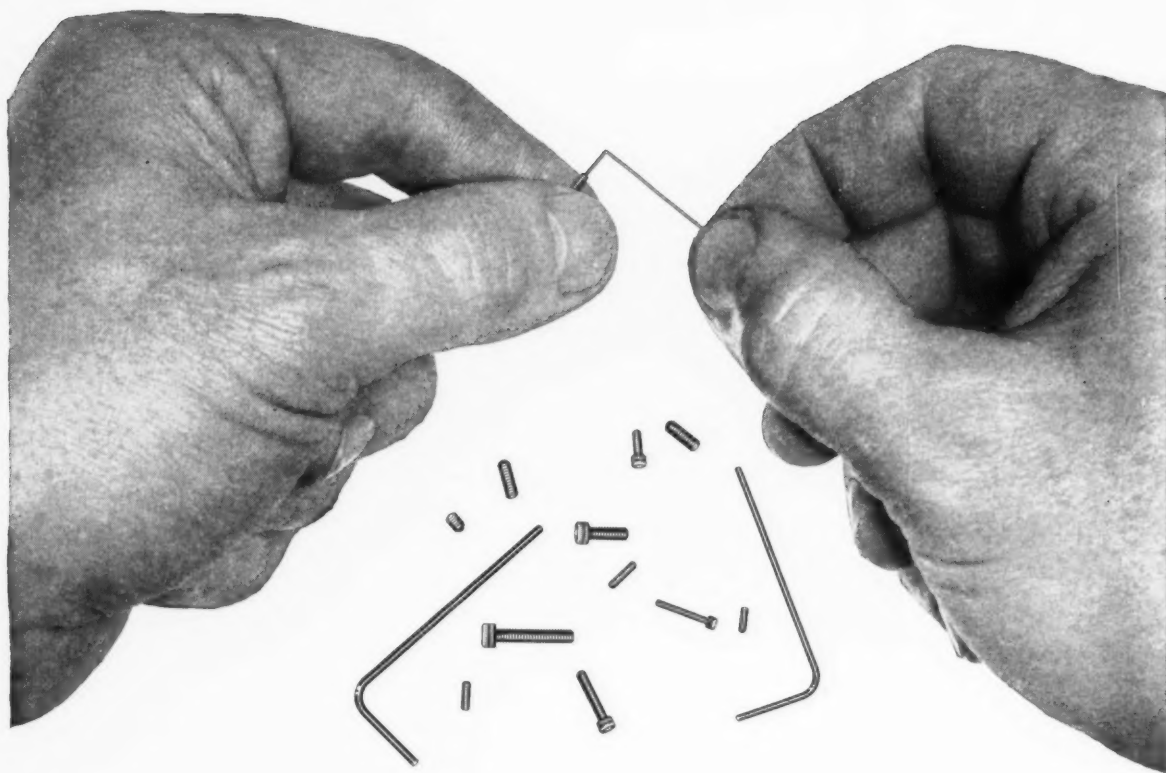
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**THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.**

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY







**If you're miniaturizing . . . you'll save space, time and money with Allen Minicaps and Minisets (#0 thru #3 dia.)**

These miniature Allen Hex Socket Cap and Set Screws will let you scale down your product sizes even farther. They're made from Allenoy special alloy steel—so strong that you can safely specify fewer screws or smaller sizes.

Allen Minicaps and Minisets are tiny, but very tough!—true Allens, with deep, clean, strong sockets and uniform Class 3A threads. Minicaps have the Allen knurled "Grip-Head" and are trimmed both on top and under the head, for tighter fit and better appearance. Minisets have the improved

small-cup Allenpoint that drives deeper and holds tighter.

Because sockets are uniformly true hexagon shape, the key or driver fits tight—makes starting much easier, saves a lot of time in assembly.

Diameters of these miniatures run from #0 through #3. Minicap lengths run from  $\frac{1}{8}$ " through  $\frac{1}{2}$ ", and Miniset lengths from  $\frac{1}{16}$ " through  $\frac{1}{4}$ ". Also standard in stainless steel. Your Industrial Distributor has them now. He'll show you why these Allens—like all Allens—hold tighter and last longer. Or write for information and samples.

Use Minicaps and Minisets wherever you need dependable fastening in very small assemblies:

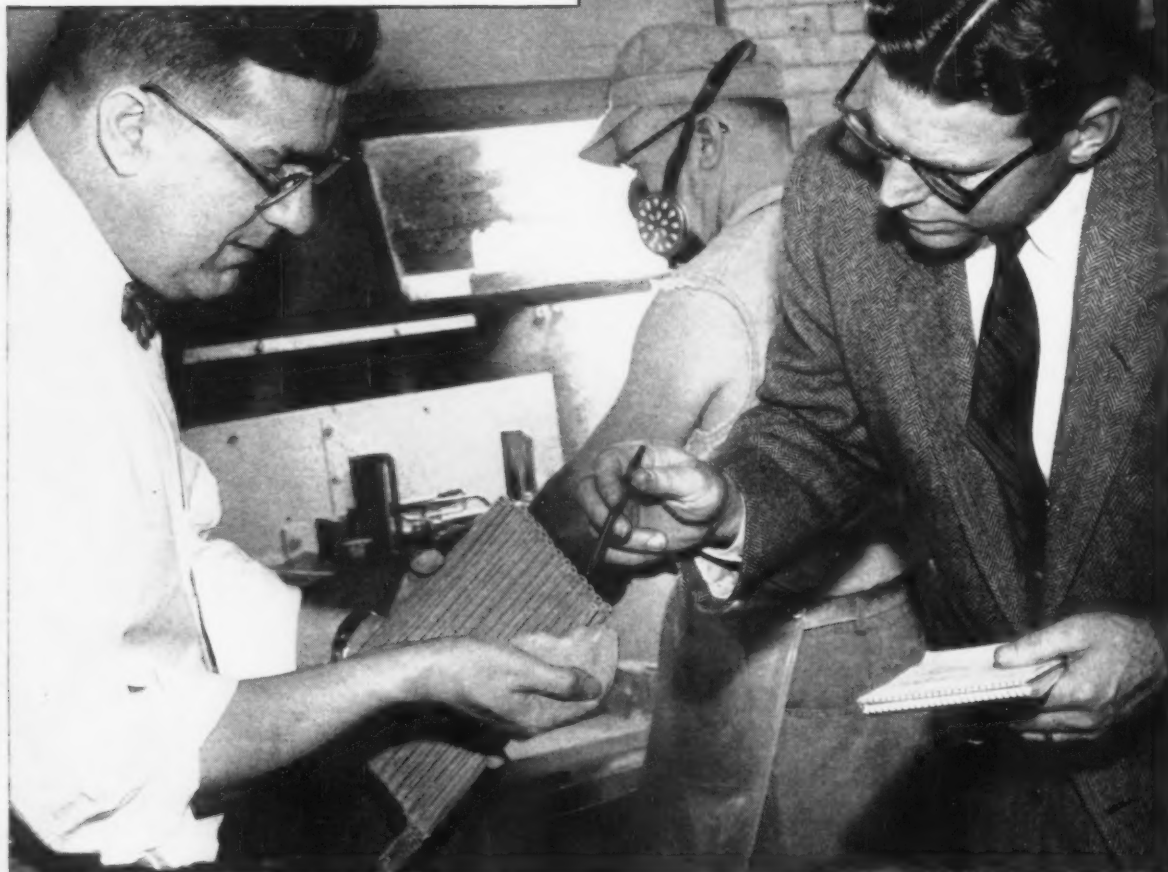
TV, radio and telephone equipment • Guided missiles, rockets  
• Panel meters • Electro-mechanical devices and servo-systems • Computers • Control and operating mechanisms for relays  
• Cameras • Instruments

*Stocked and sold by leading industrial distributors everywhere*

**ALLEN** MANUFACTURING COMPANY  
Hartford 2, Connecticut, U. S. A.



**The world of science behind  
EXIDE-IRONCLAD BATTERIES**



*Being interviewed is E. A. Wagner, Product Engineer*

**"This oxide blend packs more power per ounce"**

*At the Exide Laboratories—* **Reporter:** More power, Mr. Wagner? Do you mean the blend of oxides in Exide-Ironclad is different from that used in other batteries?

**Wagner:** Absolutely. We can use the more active oxides that give the batteries higher capacity.

**Reporter:** Why do you say *can*? Can't other batteries use these oxides too?

**Wagner:** It isn't likely. First, this blend is the result of more than 40 years of Exide research—and it's an Exide exclusive. Second, we can use it successfully because of the unique tubular construction of the Exide-Ironclad positive plate.

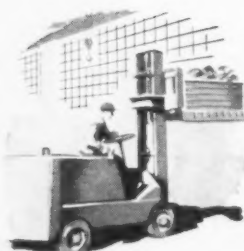
**Reporter:** How does tubular construction help make it a better battery?

**Wagner:** Because the cylindrical power tubes hold the tiny oxide particles firmly in electrical contact clear through the charge and discharge cycle. So Exide-Ironclad Batteries can maintain their high capacity—even under severe vibration—for years of service.

**Reporter:** Obviously, this is an important feature of Exide-Ironclad Batteries.

**Wagner:** Yes it is, but it's just one of many engineering details that contribute to its high capacity and long life.

**Note to battery users.** Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For bulletin, write Exide Industrial Division, The Electric Storage Battery Co., Phila. 2, Pa.



THE ELECTRIC STORAGE BATTERY COMPANY **Exide®**

# MOLY NEWS

CLIMAX MOLYBDENUM COMPANY, 500 FIFTH AVENUE, NEW YORK 36, N. Y.



## Super-Strength Structural Steels Boost Minimum Yield Strengths to 150,000 psi.

Seven steel companies in the U. S. are now producing a group of "Super-Strength Structural Steels" with considerably higher yield strengths than the well-known "High-Strength Low-Alloy" steels.

These Super-Strength steels offer minimum yield strengths ranging from 55,000 to 150,000 psi. And they have other useful properties, depending on composition, including strength at moderate temperatures, toughness at low temperatures, and good wear resistance. Almost all of these steels contain molybdenum as an essential element.

The search for steels with greater yield strengths has gone on for many

years. Before about 1930, carbon steels with a yield point of roughly 30,000 psi were standard for almost all structural purposes. Then came the development of "High-Strength Low-Alloy" steels. They boosted minimum yields into the 50,000 psi range.

Now, the newer Super-Strength Structural Steels are being welcomed by designers, who see in them a way to solve one of their major problems—to minimize weight and size while retaining quality and reliability.

... For more information on these steels, including their trade names and compositions, circle number 1 on the coupon.

## Moly's High Hot Strength Shows Promise for Jets and Rockets

Molybdenum-base alloys were described at the 1955 American Rocket Society annual meeting as having the greatest promise for true high-temperature operation.

Missile and powerplant designers are interested in moly mainly for its high temperature strength. Molybdenum-base alloys have been developed with higher useful strength at temperatures over 1600 F than any other presently known metallic material.

The jet propulsion field—including guided missiles and aircraft powered by rocket, ramjet, and turbojet engines—covers a tremendous variety of requirements and service conditions in respect to temperature, atmosphere, amount and type of stress, vibration, thermal shock, and prospective life. Molybdenum's properties make it a logical choice in many cases because it has:

1. High creep and rupture strength.
2. High tensile strength at high temperatures.
3. High modulus of elasticity.
4. A combination of high thermal conductivity, low specific heat, and low expansivity, which minimizes non-uniform temperature distribution and makes molybdenum insensitive to thermal shock.
5. High resistance to erosion by hot gases.
6. High melting point.

It seems safe to conclude that molybdenum-base alloys will become important structural materials in the jet propulsion field. And they will become essential for many parts operating at temperatures in excess of 1600 F.

... from "Molybdenum for High strength at High Temperatures," by R. Freeman and J. Briggs, JET PROPULSION, February, 1957.

For a copy of the complete article, circle number 2 on the coupon.

## Moly Adds Strength and Corrosion Resistance to Titanium

Commercially pure titanium is fairly strong and highly corrosion-resistant. Alloying it, however, substantially increases these useful properties.

Molybdenum may prove to be one of the most useful of the alloying elements for titanium. Studies at Armour Research Foundation, for example, show that when molybdenum is used instead of vanadium, creep properties are greatly improved. At 1020 F, a stress of approximately 20,000 psi produces a creep rate of  $10^{-4}$  in. per in. per hr in Ti-6 Al and Ti-6 Al-4 V, whereas 40,000 psi is required to produce the same creep rate in a Ti-7 Al-3 Mo alloy.

In summary, new alloy development is opening the way for titanium's extensive use in jet engines and air frames. Ti-Al-Mo alloys, for example, give better elevated temperature properties than the Ti-6 Al-4 V alloy now most widely used. And the alloy containing 7% Al and 3% Mo appears particularly promising.

Another Ti-Mo alloy contains 30 to 40% Mo. This alloy is claimed to resist boiling 40% sulphuric acid and boiling 20% hydrochloric acid as well as platinum, tantalum or gold. Such a retained beta alloy is weldable and could be fabricated into sheet. These corrosion-resistant characteristics would add to the value of all-beta Ti-Mo alloys.

... from "Molybdenum as an Alloy Addition for Titanium," by Harold Margolin, METAL PROGRESS, February, 1957.

For a copy of the complete article, circle number 3 on the coupon.

## Moly Goes to Sea In A Sewer



Cast iron joint ring in pipe, before lowering into position. Joint rings were made by Alhambra Foundry Co., Ltd. and the concrete pipes poured by American Pipe and Construction Co.

Positioning 64 ton reinforced concrete sewer pipe sections puts quite a strain on the cast iron joint rings used to join them. Especially when the job is done under water at depths up to 210 feet.

Joint rings must be strong enough to withstand stresses developed when the pipe is drawn together, plus sufficient impact resistance to withstand handling and placement.

Those are good reasons why the County Sanitation District No. 2 of Los Angeles County specifies ASTM A 48, class 40 iron for the rings. In addition to the required 40,000 psi, tensile strength, and 2600 lb transverse strength minimum, (on a 1.2 in. test bar), the bar must be capable of deflecting at least 0.20 in. and the iron must contain at least 0.40% Cr, 0.60% Cu and 0.35% Mo.

Examination of pipe lengths after six years' service showed them in excellent condition. Equally good performance is expected from the most recent installations which extend some 8000 feet into the Pacific Ocean, and are believed to be among the largest in the country.

... For more information on the contribution of moly to toughness and shock resistance of cast iron, circle number 4 on the coupon.

Climax Molybdenum Company, Dept. 2,  
500 Fifth Avenue, New York 36, N. Y.

I'd like more information on:

1 2 3 4

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_



*Bay State abrasive engineer Don Kennedy put in enough years in the Navy to learn about rust removal and other grinding jobs the hard way. Whatever your company's grinding problems maybe, you'll find Bay State representatives like Don Kennedy ready to help and competent to work out practical solutions.*



**They're wearing  
his "hat" wheels\*  
...and they wear well**

When Bay State's now-famous "hat" wheels\* were first introduced at a large East Coast shipyard, they caused quite a sensation. Here were revolutionary new grinding wheels that tore off metal like cup wheels but were much less heavy . . . that handled as easily as coated abrasive discs but cut faster, lasted longer and did more work at lower cost.

In addition to outstanding product performance, however, Bay State offers prompt, intelligent service. Sales engineer Don Kennedy not only works with top supervisors; he gets out on the job with the operators and digs into their problems, too.

As a result, his recommendations are both practical and specific . . . Blue Flash for speed and heavy stock removal . . . Bayflex to resist loading on soft metals . . . Saf-T-Cut for longer life on hard, jagged surfaces . . . DuraCut for blending and finishing broad areas.

*\* Raised hub disc wheels, reinforced for extra safety.*



## **BAY STATE ABRASIVES**

Bay State Abrasive Products Co., Westboro, Massachusetts  
Branch Offices and Warehouses: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh. Distributors: All principal cities. Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ontario.





*Brush wire, crimped (as shown) or straight, now produced in multiple strand, and furnished in coils or straight banks depending on wire size.*

## ***How a new idea in wire cleaned up a brush production problem***

● Maybe you can profit by the kind of interest and action applied to customers' problems by the Worcester Wire Works Division of National-Standard. Take wire brush manufacture for example . . .

Until recently, brush manufacturers had to cut through a coil of wire, then gather by hand and by guesswork the approximate number of wires for the type of brush in production. Naturally this involved a lot of cut-off waste, plus the wire lost through faulty guesswork.

Now, to overcome this waste, Worcester Wire Works

has developed ways to produce and furnish wire in pre-determined bunches (up to 400 wires per bunch) with *exactly* the right number of wires for a given brush. Much costly loss is eliminated, more brushes are produced per pound of wire, and production is speeded.

The point is, Worcester Wire Works people specialize in more than quality wire. They also specialize in the kind of service and exploration that time and again cuts costs for customers. Better check with them on your wire needs. You'll like the way they do business.

**NATIONAL-STANDARD COMPANY • NILES, MICHIGAN**  
Tire Wire, Stainless, Fabricated Braids and Tape

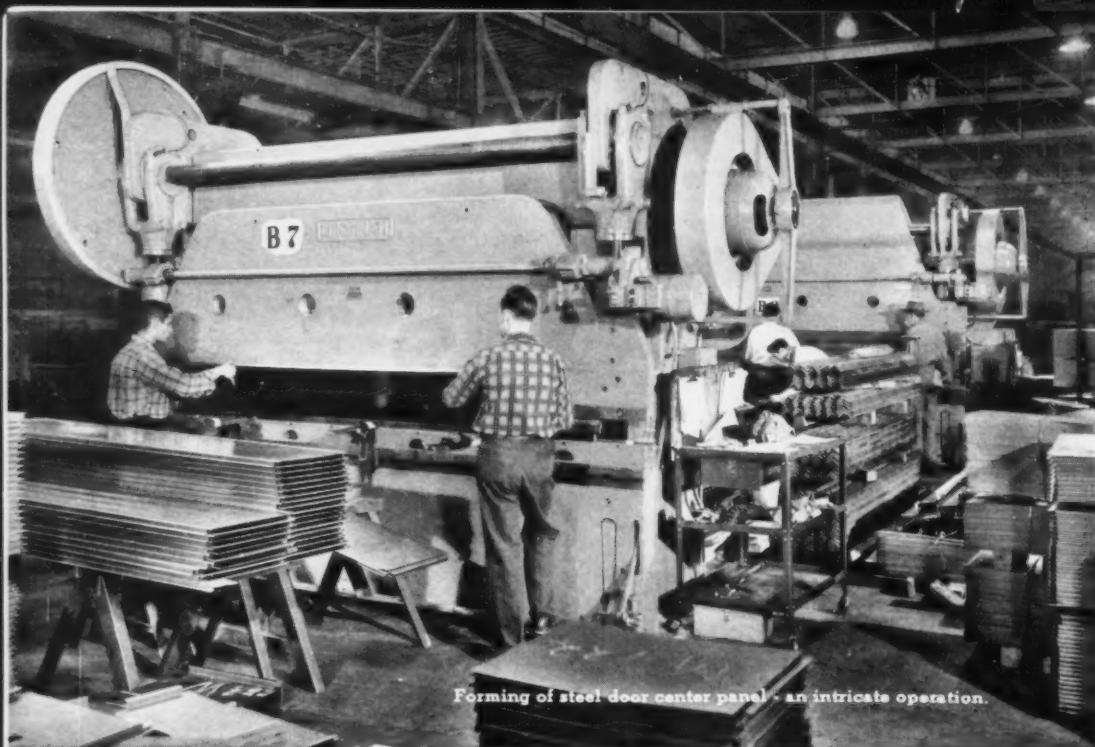
**ATHENIA STEEL DIVISION • CLIFTON, N. J.**  
Flat, High Carbon, Cold Rolled Spring Steel

**REYNOLDS WIRE DIVISION • DIXON, ILLINOIS**  
Industrial Wire Cloth



**WAGNER LITHO MACHINERY • JERSEY CITY, N. J.**  
Special Machinery for Metal Decorating

**WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.**  
Round and Shaped Steel Wire, Small Sizes



*Photos courtesy the Steelcraft Manufacturing Company, Cincinnati, Ohio.*

## **"CINCINNATI EQUIPMENT IS THE BEST IN OUR SHOP..."**

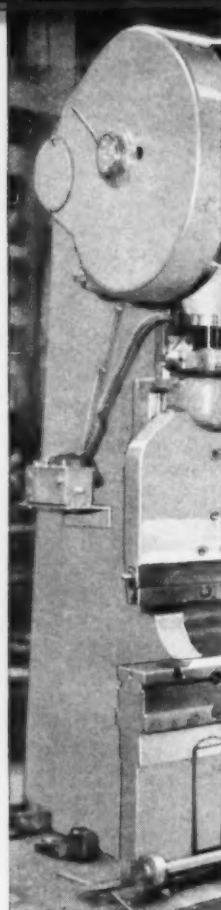
Quote from **The Steelcraft Mfg. Co.**  
Cincinnati, Ohio

"We found Cincinnati equipment to be the best in our shop. Press Brake and Shear operations are very accurate. The Cincinnati machines are easy to operate and require a minimum of maintenance and are constantly in use.

The 10 Cincinnati Press Brakes and 4 Cincinnati Shears produce parts for a number of different end products. These precision products are such that the parts must be very accurately sheared, formed and

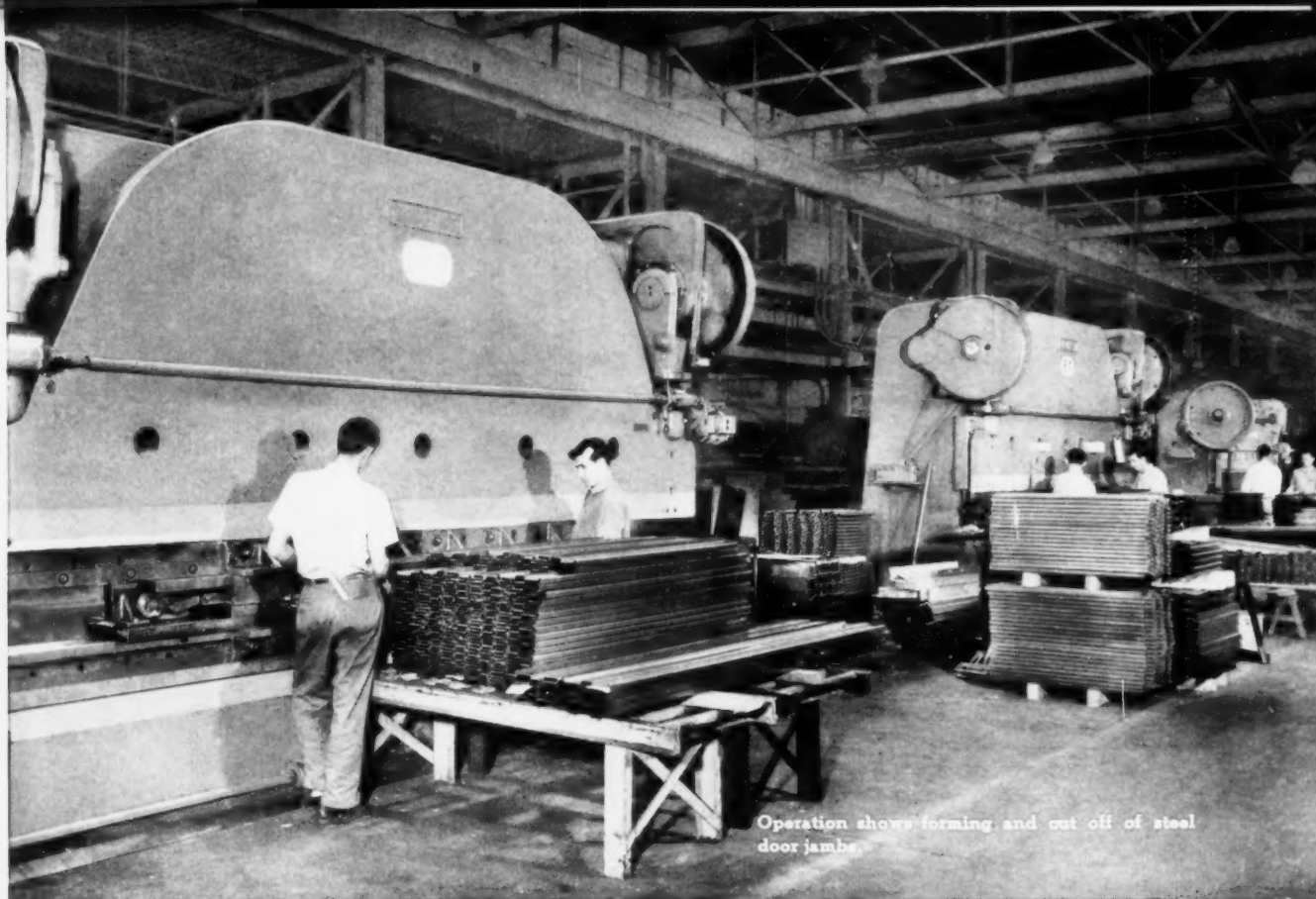
punched in order for assembly to go smoothly. Principal products whose parts are made on these machines are steel doors and frames, steel sliding and folding closet doors, and pre-engineered standard steel buildings."

The above statement from a Cincinnati user indicates satisfaction. Do you have production problems that involve Shears or Press Brakes? We suggest you consult our Application Engineering Department.

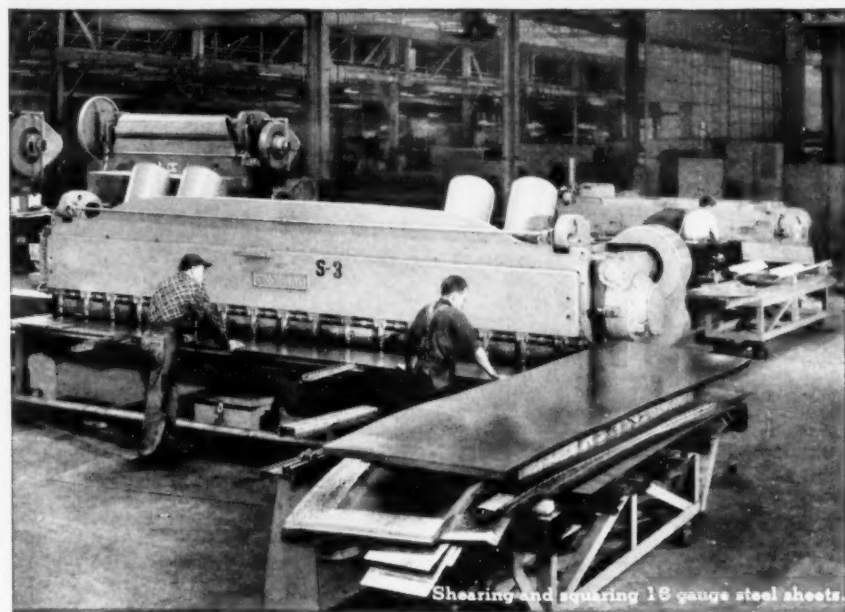


# **THE CINCINNATI SHAPER CO.**

CINCINNATI 25, OHIO, U.S.A. SHAPERS · SHEARS · PRESS BRAKES



Operation shows forming and cut off of steel door jambs.



Shearing and squaring 18 gauge steel sheets.



Sides, roof, frame of standard building, door frames and panels are all sheared, formed and punched on Cincinnati machines.

Write Department B for new Cincinnati Press Brake Catalog B-5.

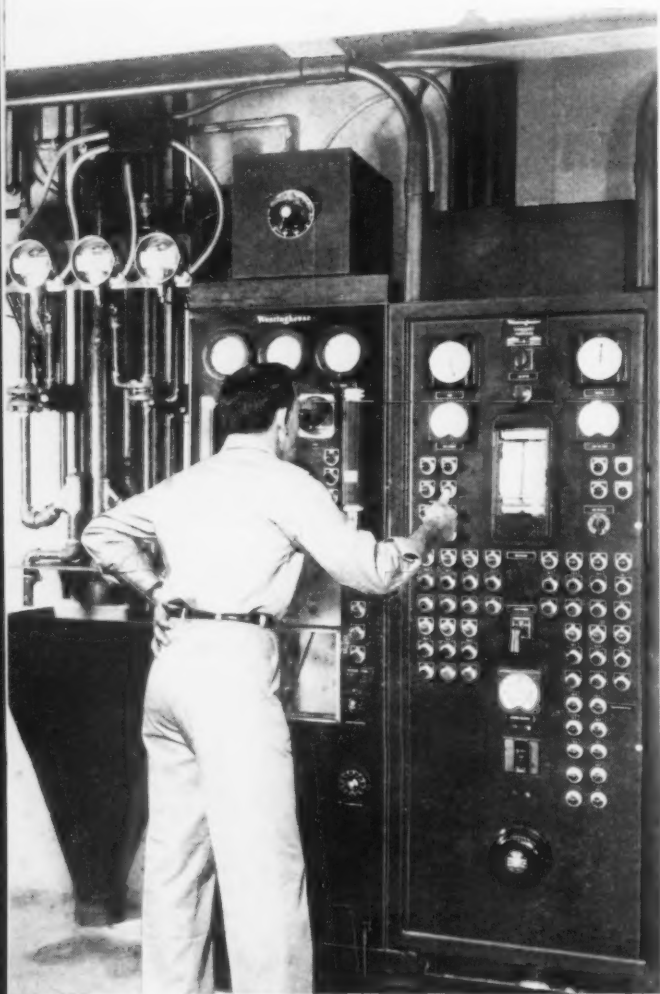


For Shear information, write Department B for Cincinnati Shear Catalog S-7R.

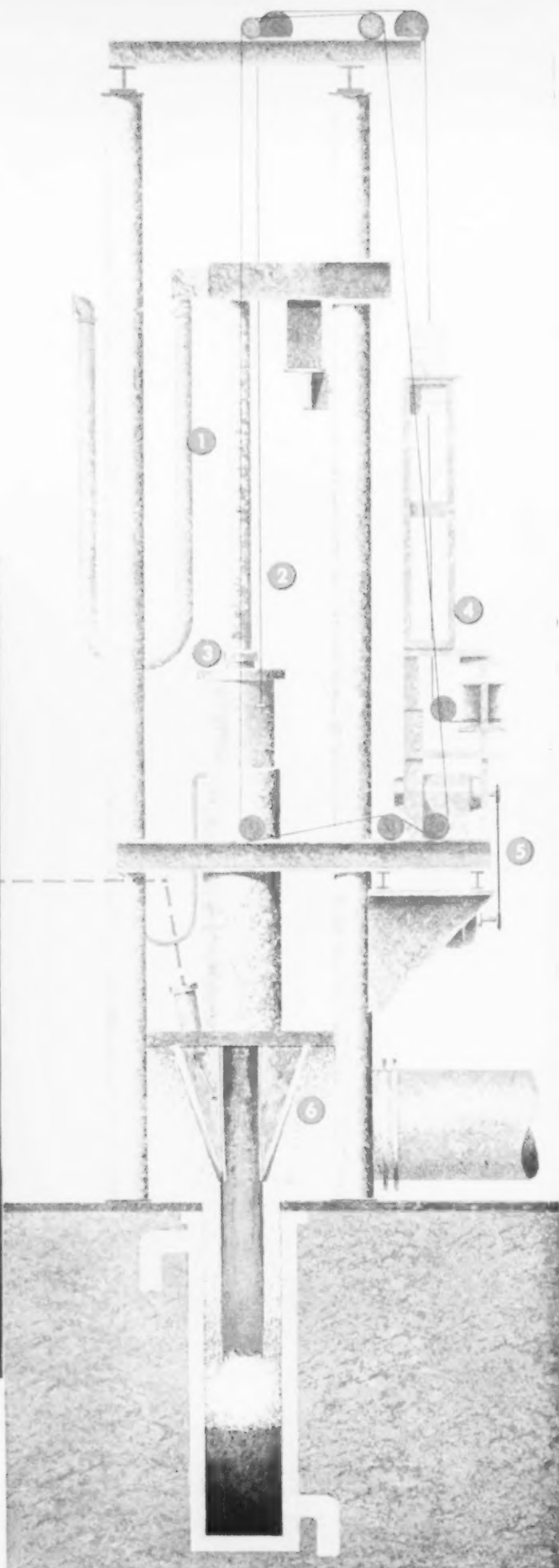




- 1 Water-cooled power cables.
- 2 Electrode holder.
- 3 Vacuum-tight seal for electrode housing.
- 4 Lifting mechanism for electrode housing.
- 5 Automatic electrode position drive.
- 6 Electrode guides.



Automatic control panel sequences and monitors vacuum arc furnace operation. Built-in optical system allows operator to observe melting progress.





## Westinghouse installs largest vacuum arc furnace at Carborundum Metals Company

Tough requirements for melting large, zirconium ingots have been minimized at Carborundum Metals Company by a new Westinghouse vacuum arc furnace. This furnace produces 8" or 12" first-melt ingots and 12" or 16" double-melt ingots up to 2200 lbs. Top metallurgical functioning results from careful design and construction.

Furnace design is backed by extensive vacuum chamber research. This work developed methods for controlling the action of an arc in high vacuum. At Westinghouse Metals Pilot Plant these laboratory conclusions were scaled-up in production size melts. Ingot analysis verified furnace design and operating procedure.

Careful attention was given to electrical and mechanical components, too. Power cables are permanently connected for positive electrical contact. Electrode movement is governed by positive downward drive, and a positioning mechanism guides the electrode on true center. All drive components are externally mounted for easy inspection.

Capable of every step from research to equipment manufacturing, Westinghouse can be a single source for your vacuum metallurgy needs. It's another example of the way Westinghouse helps you POWER-UP . . . to get better production and profit from your electrical dollar. Talk it over with your Westinghouse Industrial Heating representative or write Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Pa.

J-10465

YOU CAN BE SURE...IF IT'S

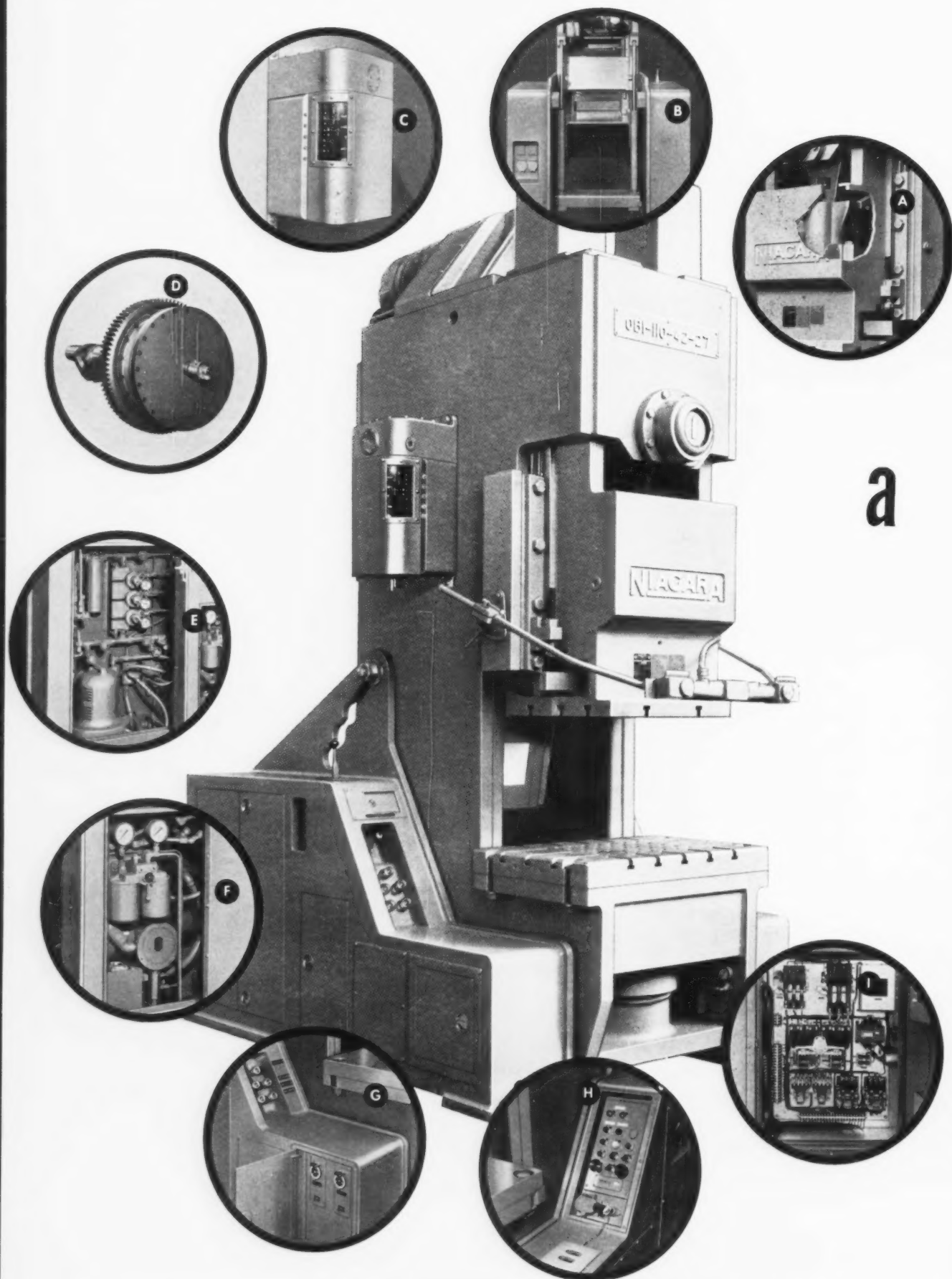
# Westinghouse



Accurate electrode centering is maintained by fixed guides; sound construction provides added safety.



Sturdy ingot molds, ranging from 8 to 16 inches in diameter afford simple installation . . . large cooling water connections . . . arc stabilization connections.





**from Niagara comes...**

# truly revolutionary line of OBI's

## automated to hit new production highs

Never before has there been an OBI like this. In feature after feature, you'll see pulse-quickeness that will inject speed and rhythm into your production. Outfitted with today's most advanced controls and devices, this all-new Niagara Series EA offers you automation at its very best.

Boasting a revolutionary front-to-back crankshaft design, it's streamlined in an ultra-modern, functionally sound, eye-pleasing way. In fact, it's the only totally-enclosed OBI ever made. There are no exposed, overhanging gears, flywheel or other mechanisms. With the entire driving assembly fully enclosed within the limits of the compact frame, this trim-line performer actually takes up less floor space than any press in its range and category. It's only natural that such a triumphant line of OBI's as this should parade from Niagara... for Niagara has been leading the way, *all of the way*, in building all types of OBI's—single crank and double crank, standard and fully automatic. Hailed as "the latest and greatest of them all," the Series EA is built in 4 sizes, with shaft diameters from 4 1/2 to 7 1/2 inches and capacities from 75 to 200 tons.

**FULL DETAILS ARE YOURS FOR THE ASKING:**

Write for illustrated Bulletin 56 today!

NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, N. Y.  
DISTRICT OFFICES

Boston • Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia  
Distributors in principal U. S. cities and major foreign countries

# NIAGARA

## front-to-back crankshaft AUTOMATED INCLINABLES

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

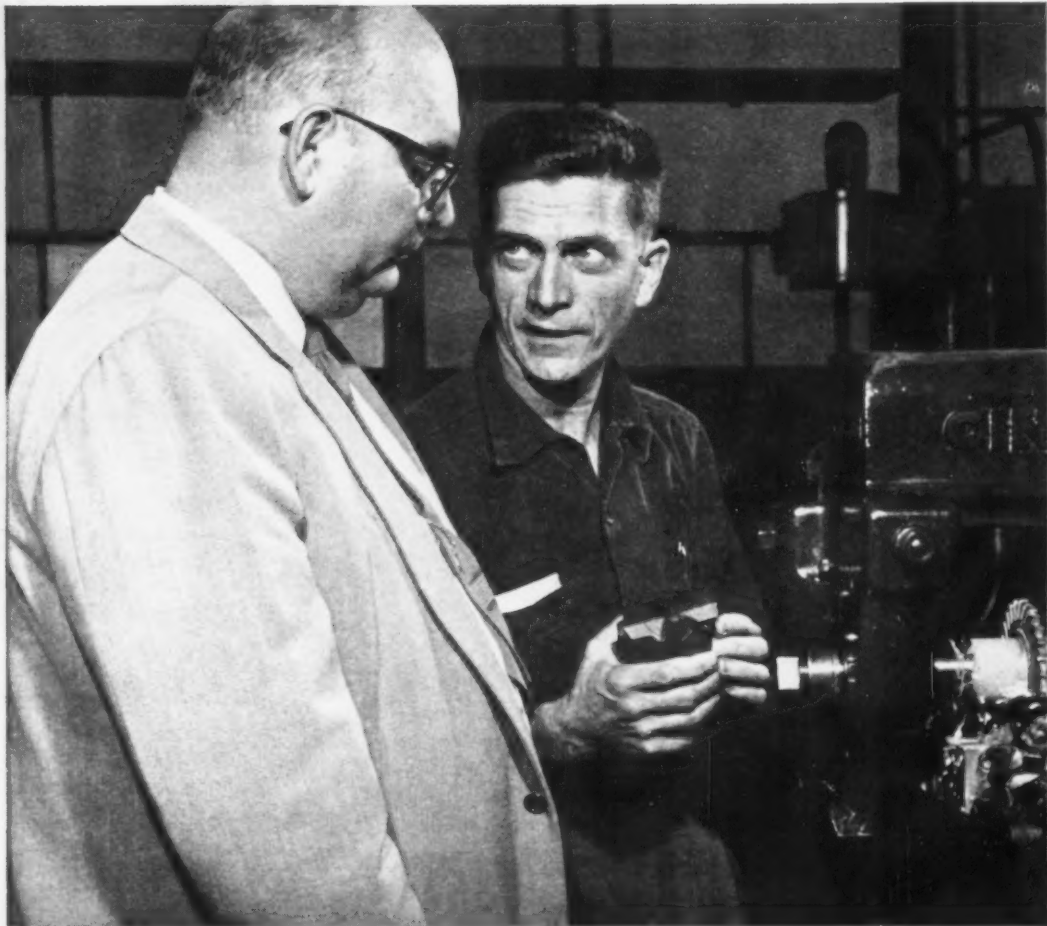
- A POWER OPERATED BARREL TYPE SLIDE ADJUSTMENT** facilitates and speeds die-setting. Push button operated, it's not only fast and smooth but permits micro-positioning within a thousandth of an inch.
- B HYDRAULIC INCLINING DEVICE** operates smoothly. The press can be inclined or brought upright in approximately 2 minutes. Operating lever and push buttons conveniently located on left panel leg.
- C BRAIN CENTER OF THE AUTOMATION SYSTEM**, the Rotary Limit Switch can be adjusted precisely while the press is in motion for synchronizing automation devices with press cycle.
- D LOW INERTIA, ELECTRO-PNEUMATIC FRICTION CLUTCH** operates directly on the crankshaft. Most of its weight continues to rotate with the main gear. Only the crankshaft and driving plate are started and stopped at each cycle. Heat and wear are reduced to an absolute minimum. Torque capacity may be changed by adjusting air pressure.
- E AIR CONTROL PANEL AND HYDRAULIC INCLINING SYSTEM** are neatly housed within the left leg. Air line filter, pressure regulator, gages, blow-off valves and lubricators, as well as the hydraulic pump for the inclining system, are all concealed behind a dust-tight door.
- F AUTOMATIC CIRCULATING OIL SYSTEM** (left panel leg) sends metered flow of clean, filtered oil to all bearings and gears in the crown, air counterbalance and slide gibs. Correct operating oil pressure is maintained or the press stops automatically.
- G CONTROLLED AIR SUPPLY AND PNEUMATIC TIMING RELAYS** (left panel leg): Air line receptacles, synchronized with press cycle, are provided for die doper, die kicker and die lifter... with auxiliary receptacles for die maintenance tools. Adjustable timing relays control interval of automation functions initiated by rotary limit switch.
- H OPERATOR'S PANEL** (right panel leg) features deluxe operating controls conveniently arranged for fingertip direction of every press motion. Chained to safety block, safety plug de-energizes entire press control when pulled from its receptacle.
- I COMBINATION MOTOR AND PRESS CONTROL PANEL** fully enclosed within the right leg behind a flush-mounted, dust-and-oil-tight door, houses: disconnect switches, circuit protection, transformers, fuses for main motor and auxiliary power supply; control relays; starters for main motor, lubrication and hydraulic pumps.

**PNEUMATIC CUSHION** is automatically lubricated by self-contained pumping system; internally guided and rigidly supported by press frame.



## Bit manufacturer bites off

George P. Gaunt (right) shop superintendent shows rock bit to Joseph D. Grigas, industrial lubrication specialist at Standard Oil. Joe recommended switch to SUPERLA Soluble Oil. Joe is well qualified to make such recommendations. He has 13 years experience in such work, has a degree in engineering from Illinois Institute of Technology and is a graduate of the Standard Oil Sales Engineering School.



Brunner & Lay carbide insert rock bits are made from high chrome—nickel—moly steel, Rockwell 18C-22C hardness.



## 20% production increase

*SUPERLA Soluble Oil plus technical service  
add up to improved product output at  
Chicago Brunner & Lay Rok-Bit Corp.*

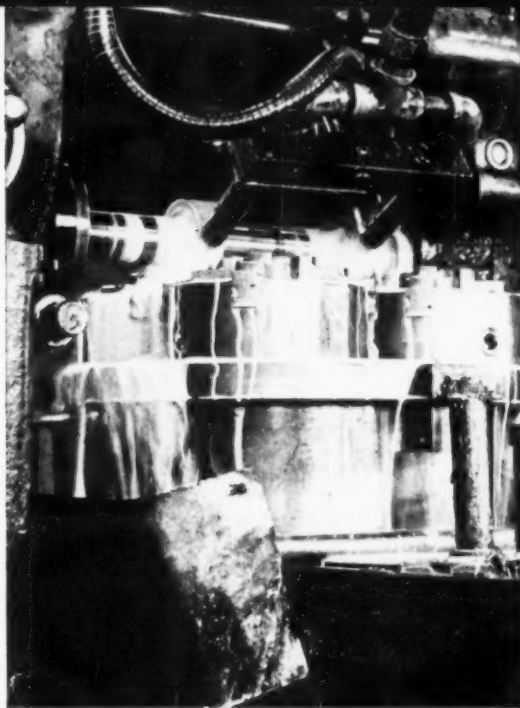
SUPERLA Soluble Oil, which is now being used by Chicago Brunner & Lay Rok-Bit Corp., has solved a lot of milling machine operating problems for the Company. Soluble oils formerly used separated out of emulsion and turned rancid in use. Oil circulating lines plugged repeatedly. The plant's production rate was not up to capacity because of frequent shut downs for cleaning of machines and for unplugging of oil lines.

**On the advice** of Joe Grigas, Standard Oil industrial lubrication specialist, the Company thoroughly cleaned the machines, then converted them to SUPERLA using the soluble oil at 10:1 dilution.

**This is how** the change-over worked out. *Production was increased 20%*. Machine down time was substantially reduced. The Company was sufficiently pleased with the performance of SUPERLA Soluble Oil in milling machines to convert two grinding machines to this oil. Results obtained on the grinding machines: excellent wheel life, good finish and rust protection of work and machines.

SUPERLA Soluble Oil emulsifies readily with all types of water. It is a stable oil and forms stable emulsions. It does not tend to develop objectionable odors in use nor is it injurious to men, work or machines. SUPERLA Soluble Oil gives good tool life and prevents rust.

**Get the facts** about SUPERLA Soluble Oil. Your Standard Oil industrial lubrication specialist has them. In any of the 15 Midwest or Rocky Mountain states, one of these lubrication specialists is nearby. Call the one nearest you. Or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.



Milled slots up to  $\frac{7}{8}$ " wide and 1" deep are made in this special alloy Rok Bit Steel in one cut. All of these milling machines use SUPERLA Soluble Oil exclusively.

### Quick facts about **SUPERLA Soluble Oil**

- Emulsifies readily
- Forms stable emulsion
- Doesn't turn rancid
- Economical. Requires low emulsion concentrations
- Prevents rusting
- Non-injurious to men, machines, work
- Gives good tool life



**STANDARD OIL COMPANY** (Indiana)



## Modern Steelmaking

# Quality of Stainless Steel Bars Improved with New Type Furnaces

**Faster, Shorter, Heating Cycles  
Permit Finer Control in Heat Treatment**

Modern, continuous furnaces have been installed by the Stainless Steel Division, J & L Steel Corporation, to insure the production of the highest quality stainless steel bars. Furnaces (illustrated at right) that feature the Duradient Burner, "focus" radiant heat so that it can be uniformly diffused and transferred without flame impingement. The result is a faster, shorter heating cycle. This, in turn, results in reduced oxidation.

These Selas furnaces will handle bars up to 4½" in cross section and lengths up to 30 feet.

### **Roller-Hearth Furnace Handles Wide Range of Sizes**

The batch-type, roller-hearth annealing furnace (illustrated below) can handle a wide range of bars from ½" to 4¾". This 153-foot furnace will accommodate bars up to 36 feet in length, or several skids of coils to supplement other coil annealing furnaces.

These new facilities contribute

directly to the kind of production flexibility that the Stainless Steel Division has designed into their combination mechanical and hand mill operation. A flexibility that enables them to supply the great variety of quality stainless steel products required by their customers.

Write or call today for our latest stock lists.



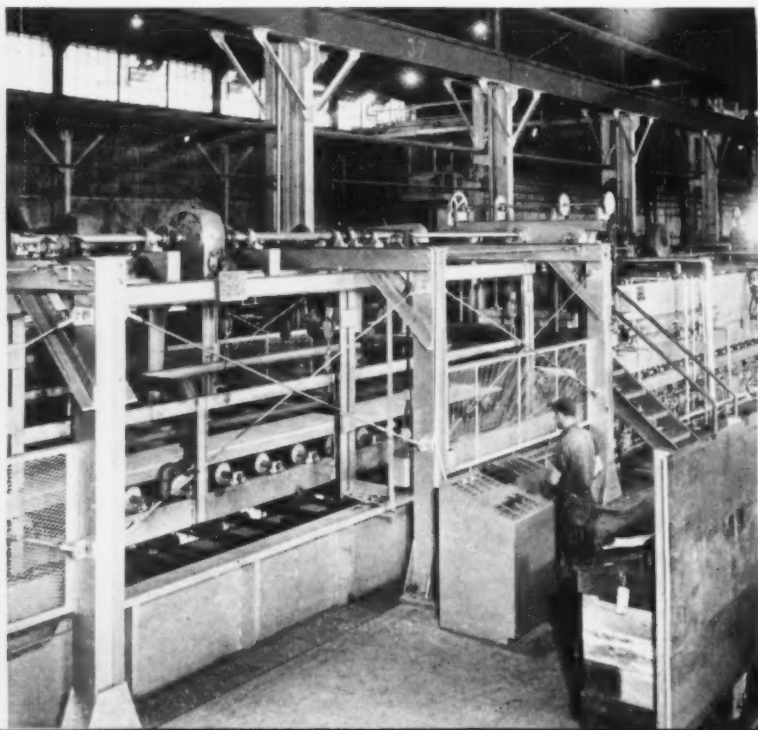
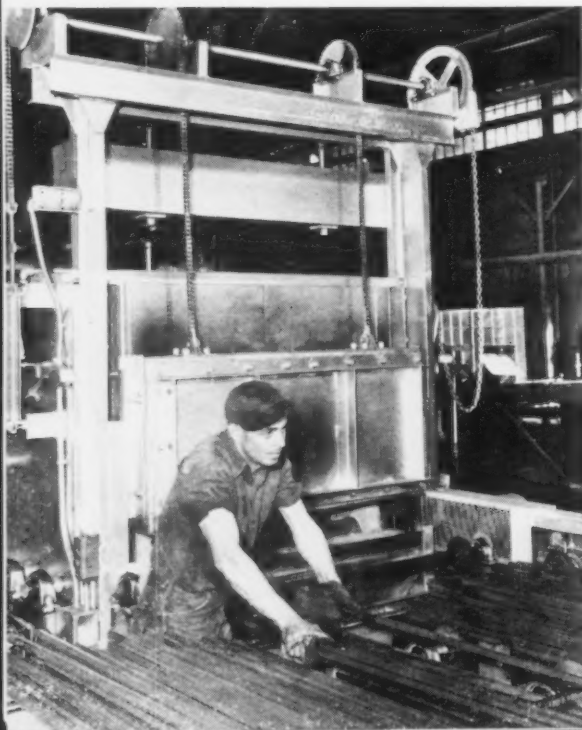
## **Jones & Laughlin**

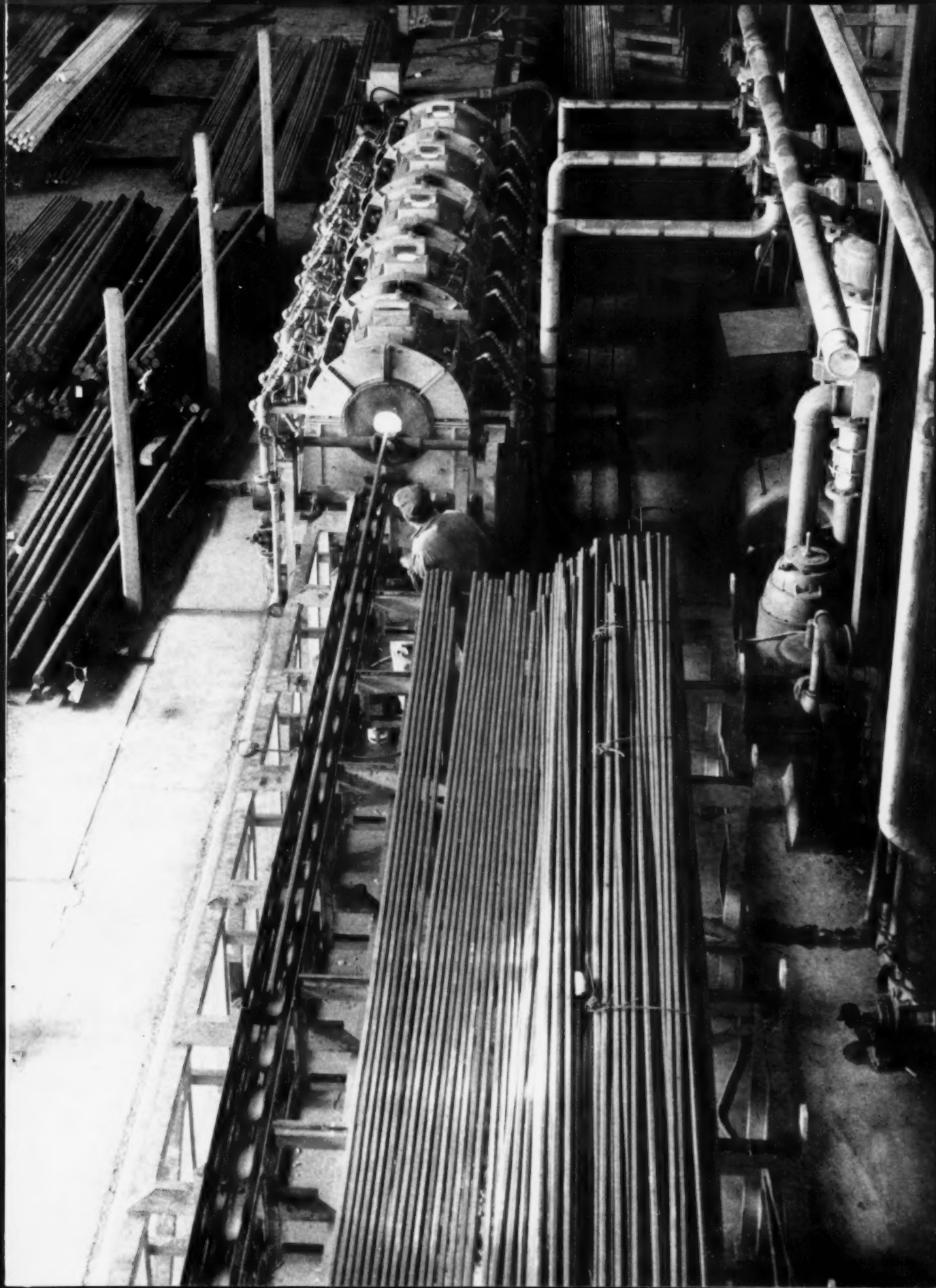
STEEL CORPORATION

**STAINLESS STEEL DIVISION**

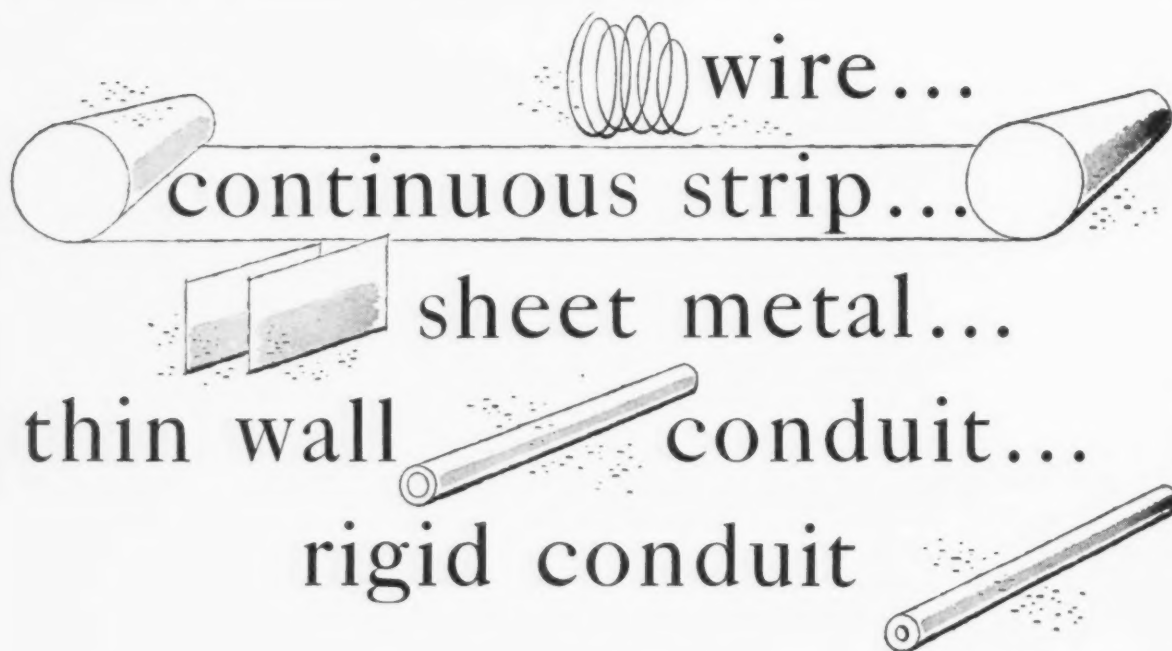
Box 4606 • Detroit 24, Michigan

FORMERLY ROTARY ELECTRIC STEEL CO.





**IF YOU PROCESS...**



YOU CAN *Automate* ALL THESE OPERATIONS:

- cleaning
- pickling
- plating
- phosphating
- scrubbing
- paint prep
- electrogalvanizing

For Faster, Better Production . . . At Far Less Cost  
with an  
**H-VW-M CONTINUOUS LINE SYSTEM**

WRITE today, at no obligation, for the facts about an  
H-VW-M System that can bring cost-saving *automation* to your  
continuous line finishing—a system that can be integrated with  
your shearing, forming, slitting or annealing operations.

**Hanson-Van Winkle-Munning Company, Matawan,  
New Jersey. Offices in principal cities**



**H-VW-M**

Industry's Workshop for the Finest in Plating, Anodizing, and Polishing Processes • Equipment • Supplies

**PLATEMANSHIP**—Your H-VW-M combination—  
of the most modern testing and develop-  
ment laboratory—of over 80 years experi-  
ence in every phase of plating and  
polishing—of a complete equipment,  
process and supply line for every need.





## Cuts chipping time 44%

**JOB:** Chipping flash and parting lines on gray iron castings. Formerly used heavier, slower hammer. Switched to Rotor C-20.

**RESULTS:** Reduced time from 135 to 75 minutes per casting with the Rotor C-20 hammer. Savings paid for hammer in 5.2 weeks. Short, fast strokes remove more metal and give better finish.

Full details on Rotor Hammers in Bulletin 37A, free on request. For demonstration, call your nearby Rotor Application Engineer or write The ROTOR TOOL Company, Cleveland 32, Ohio.

Here's the **RIGHT**  
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**Rotor Air Tools:** Assembly Tools • Drills • Small Wheel Grinders  
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**Also Performs Important  
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**O**ne major use of the Dempster-Dumpster System in a large General Electric plant is for scrap materials collection. The Dempster-Dumpster Detachable Containers are placed in various areas, such as wire preparation and parts fabrication. When they are filled the truck-mounted Dempster-Dumpster, operated by only one man, the driver, picks up load, hauls and dumps in their scrap and salvage area . . . handling one-container-after-another. In a similar manner, this amazing low cost system also is used to collect waste materials around this factory. We at Dempster Brothers are proud to name the General

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You, too, can reduce your bulk materials handling cost with this modern method — a flexible system that (1) enables you to obtain and use any required number of containers, each in the design and size to meet different material requirements, and (2) collect, haul, dump and/or transfer materials of every description with one truck-mounted Dempster-Dumpster operated by only one man, the driver. Write us today for complete information. Manufactured by Dempster Brothers, Inc.

**THERE IS A DEMPSTER-DUMPSTER DETACHABLE CONTAINER AVAILABLE OR THAT CAN BE BUILT TO SUIT THE MATERIAL—** be it solid, liquid, dusty, combustible, high temperature . . . waste or salvage, raw or finished product, and each, regardless of size up to 21 cubic yards or capacity up to and over 36,000 lbs. payload, can be handled by one truck-mounted Dempster-Dumpster with only one man, the driver! Savings are tremendous!



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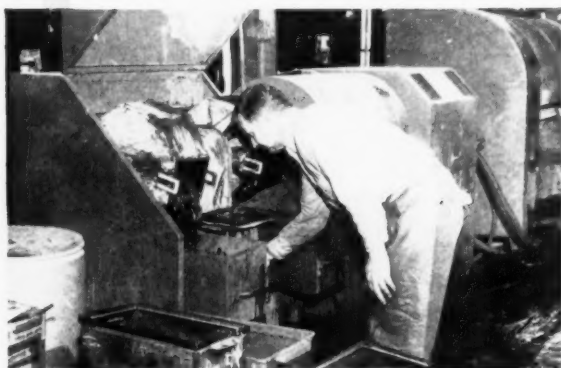
**USE TRIPLE-ACTION,  
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# IMMUNOL

(Reg. U.S. Pat. Off.)



Cleaning and polishing metal parts with IMMUNOL



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Using IMMUNOL to remove grease from cold finished bar stock in a dip tank operation

*IMMUNOL quickly cleans soils, gummy deposits, dirt and foreign matter from any metal surface...thoroughly degreases metal...leaves a protective rustproof coating as it cleans—all in one operation! In addition, IMMUNOL:*

- **ELIMINATES** the fire hazard of solvents since it is non-flammable.
- **REPLACES MORE EXPENSIVE**, less efficient soaps, alkalis and solvents.
- **IS NON-TOXIC** so operators can use it without fear of skin irritations.
- **IS ODORLESS** to increase operator efficiency.
- **IS INEXPENSIVE**. Only a few ounces of IMMUNOL per gallon of water are required to produce a gallon of solution. This solution can be used over and over again once the foreign matter has been removed.
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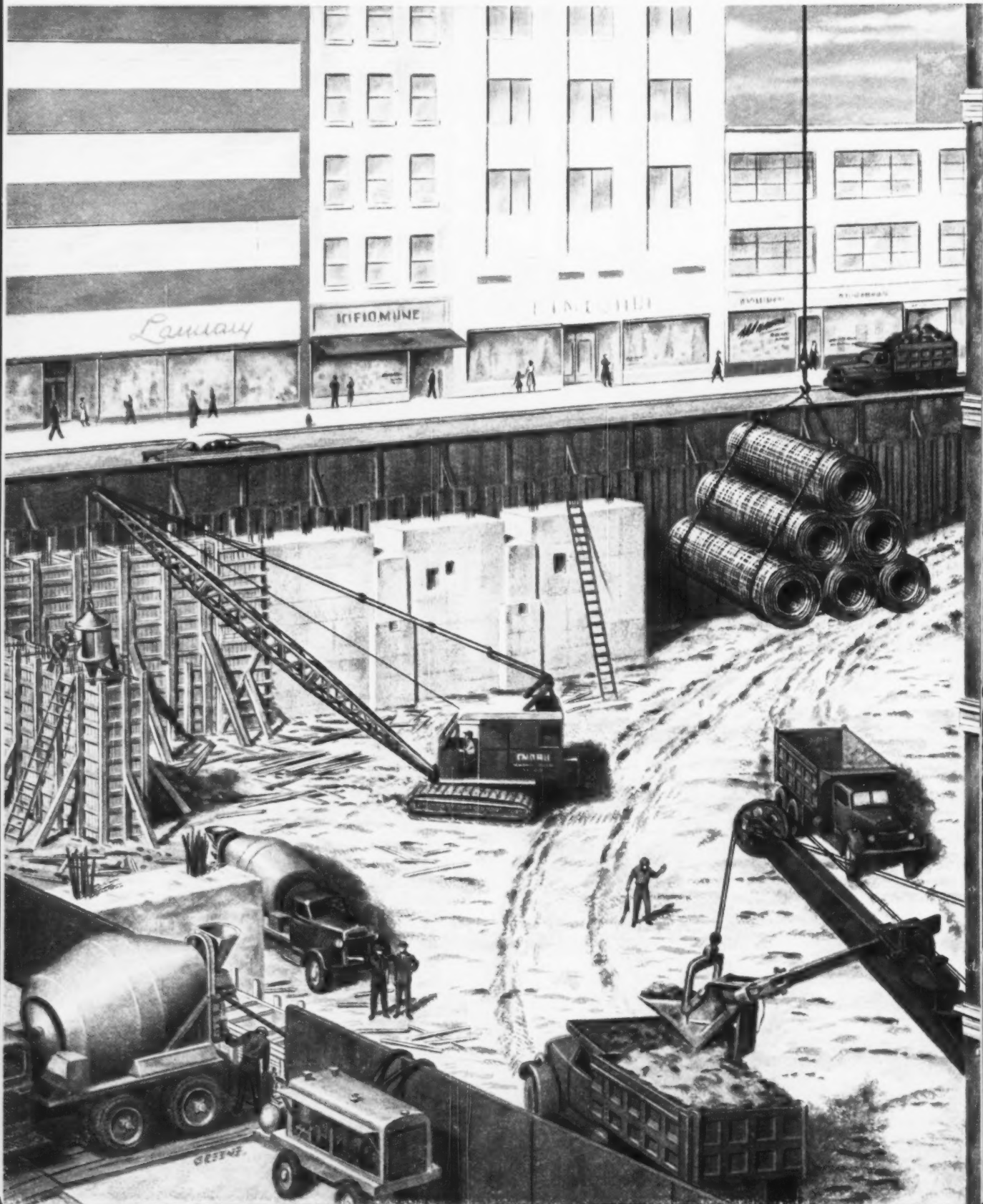
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*From start to finish...*





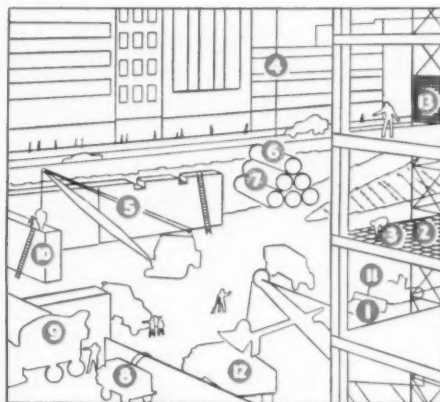


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| ⑥ Wickwire Wire Rope Slings | ⑫ Claymont Fabricated Steel Parts                 |
| ⑬ CF&I Hardware Cloth       |   |

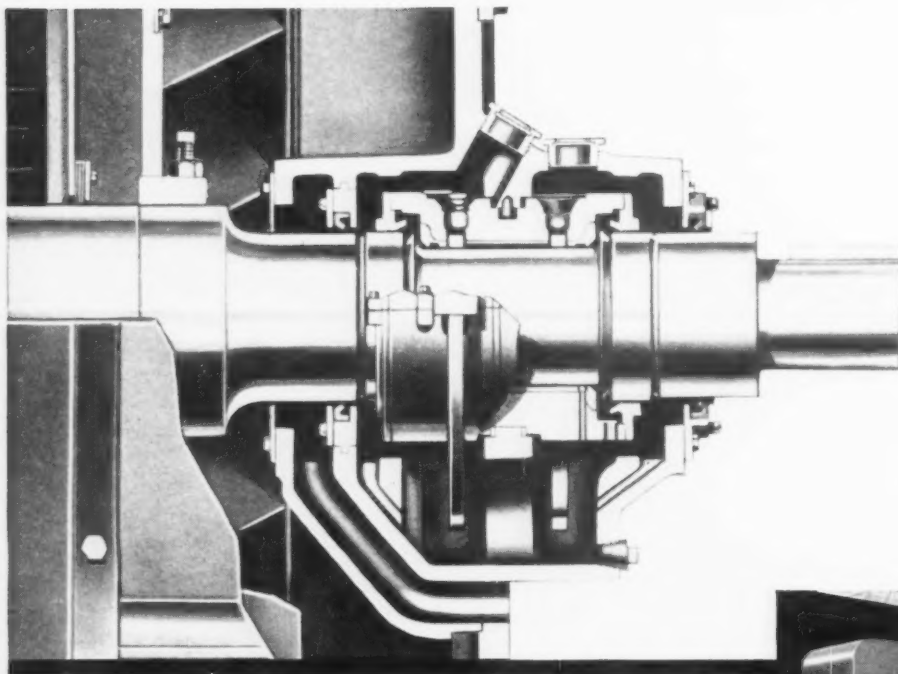
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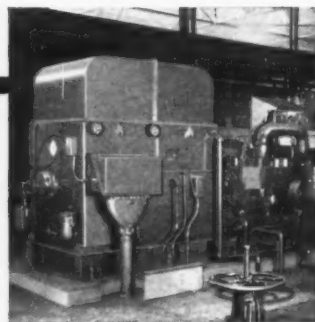
One of the many reasons why **ALLIS-CHALMERS MOTORS**  
operate dependably in the

## **METAL WORKING INDUSTRY**



### **Motor Bearing is pressure-equalized with vent**

**S**HAFT seals and a pressure-equalizing vent give double protection against oil leakage from this Allis-Chalmers motor bearing. First, seals keep oil inside the enclosure. Second, the pressure-equalizing vent chamber maintains atmospheric pressure at the inboard side of the bearing, so that fan action won't pull oil vapors out of bearing, under any conditions. This double protection assures oil-free motor interior and drip-free operation.



Two-pole motor driving descaling pump.

#### **Accessible, Too!**

Motor inspection is easy with capsule-type bearing housings. Upper halves of motor end shield and inner air baffle can be removed without opening the bearing enclosure or disturbing bearing alignment.

For details on these and other features of Allis-Chalmers motors, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.



A-5478

# **ALLIS-CHALMERS**

## Auto Parts Output To Rise

Automobile parts makers should get a boost in the remaining months of the year. Several factors are involved. One is that a growing number of 1955 cars produced in that record year need repairs. Another item: rising number of total vehicles in use swells the replacement-part potential. Finally: predicted 6 million new car sales for this year will cause automakers to increase some of their standing orders for parts.

## No-Dust Concrete Floors

One-coat, penetrating finishes for concrete floors show promise of reducing upkeep and dusting in busy plant areas. Single finishes combine the functions of curing agents, sealers and hardeners. Where carpeting or any other floor cover is used, these new finishes act as water barriers and reduce the chance of moisture being trapped between the floor slab and the cover.

## Synthetic Coatings Best

Keep an eye on protective coatings made of synthetic resins—alkyds, phenolics, vinyls, chlorinated rubber. After three years of a long-term evaluation of their capabilities the synthetics have already outperformed the conventional paints used as controls. This was over blast-cleaned and steam-cleaned surfaces. The next step will be to check them out on surfaces cleaned by hand or with power tools.

## Welding Machine Sales Up

Use of mechanized welding processes is booming in answer to demands for more production, controlled quality and lower costs. One manufacturer of equipment predicts this rapid growth, coupled with new developments, will push the industry's sales well over the \$1 billion mark before 1960.

## Navy Wants Open Water

Navy officials argue lustily for the strength to hold the sea lanes open. They contend the U. S. is self-sufficient in only 11 of the 77 strategic materials needed in defense production. All or part of the other 66 items must be im-

ported. Chromium, tin, cobalt and rubber must be brought in by ship. And in event of war, this shipping will have to be protected against submarine and air attack.

## Handwrapped Plate Out

Coming soon: automatic packaging of tinplate. Wrapping of sheared tinplate is probably the last manual operation remaining in today's highly-automated electrolytic mills. Producers are window shopping various types of packaging equipment with an eye to adapting the technique to tinplate operations.

## Magnet Makes Watch Tick

One of the vital elements in Hamilton's new electric wrist watch is a tiny magnet no larger in diameter than an ordinary paper clip. Yet, it's strong enough to hold ferrous objects 215 times its own weight. The magnet, a 77 pct platinum—23 pct cobalt alloy, is said to be not only the most expensive magnet material but also the most powerful.

## Tighten Competition

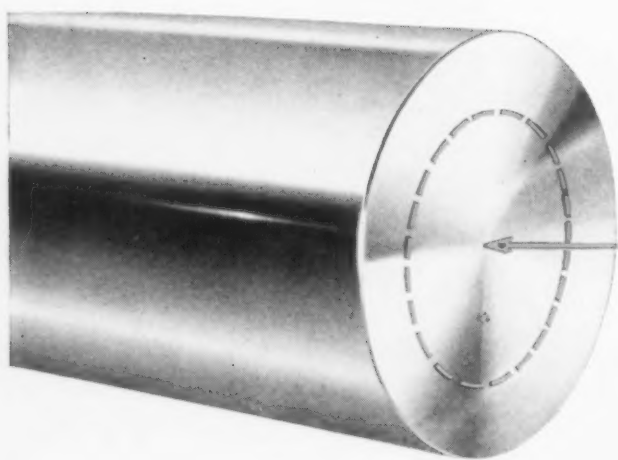
Even though backlogs of orders for steel mill equipment are still quite heavy, the bidding for new jobs seems to be rougher than ever. Suppliers now quote 18-month delivery on blooming mills and other major equipment. Yet, only a short time ago, they were quoting 24-month delivery.

## New Alloy Beats Heat

A new nickel alloy aims at taking on the job of resisting high-temperature stresses in critical parts of jet engine combustion systems. Containing some titanium, the nickel-iron-chromium alloy comes in sheet form and is designed to withstand temperatures of at least 1400°F.

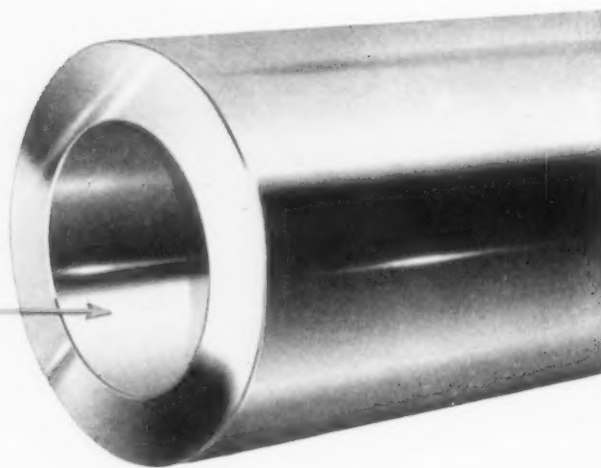
## More Machine Tool Sales

Reports from distributors filtering into one machine tool builder's headquarters indicate a significant upturn in sales, starting in September. Word is that prospects are tired of "waiting to see what's going to happen."



*Why bore this out . . .*

*when you can get the  
hole ready-made?*



## Save money on hollow parts by switching from bar stock to TIMKEN® seamless steel tubing

Check these savings you get when you make hollow parts with Timken® seamless steel tubing instead of bar stock:

1. **NO HOLE TO DRILL**—it's already there.
2. **ELIMINATION OF COSTLY BORING OPERATION** frees part of your screw machines for other jobs—adds machining capacity *without* adding machines.

3. **MORE PARTS PER TON OF STEEL** because there's less metal to hog out.

And with Timken seamless steel tubing you get better quality finished products. The piercing operation by which Timken seamless steel tubing is made gives the tubing its fine forged quality. A solid round is forged over a mandrel, thoroughly working the metal inside and out. Accurate temperature and piercing speed control combine

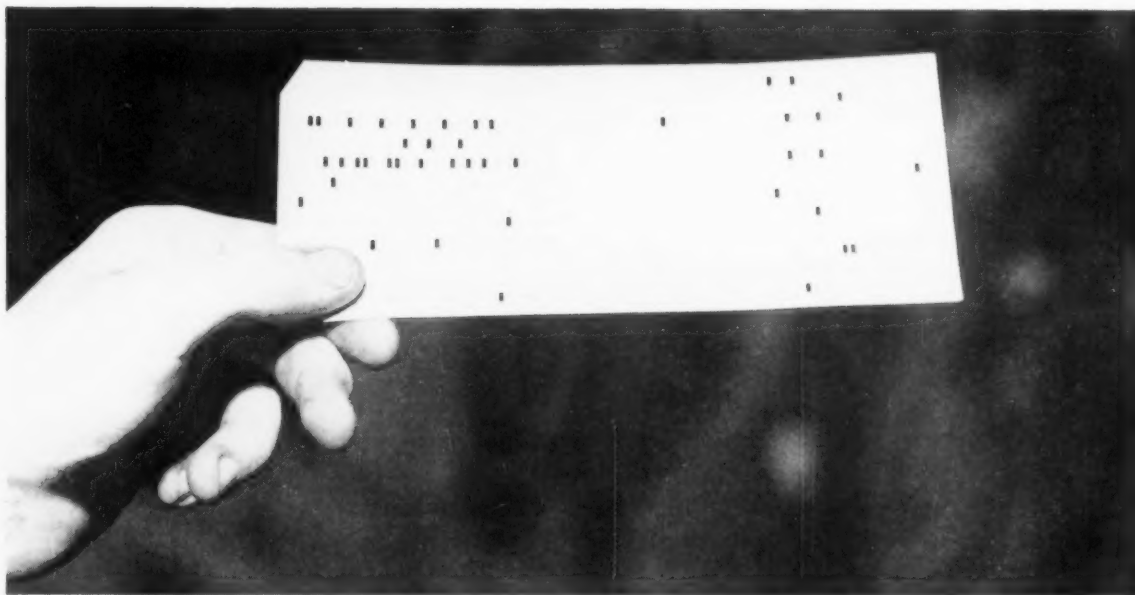
to produce uniform, fine forged quality. And we maintain this quality from tube to tube, heat to heat, order to order.

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# TIMKEN *Fine Alloy* STEEL

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING





**KEY TO MILL AUTOMATION:** Typical Allegheny Ludlum punch card in trend to automatic mill controls.

# To Improve Quality, Mills Push Automatic Controls

## Card Programming Gains in Scope

**Primary and roughing operations still lead in steel's use of automatic controls.**

**Other applications found on hot strip, structural and tinplate mills.—By G. J. McManus.**

■ Look for steel mill controls to make a large splash in coming months.

At least 10 steel producers will soon have reversing mills controlled by punched cards. At least one tandem cold mill will be partially controlled by program cards.

And at least one hot strip mill is now equipped with controls that

react automatically to changing conditions.

Big consideration in the control push is quality. Mills aren't out to pare off a few operators or squeeze out a few more tons. What they want is better and more uniform quality.

**Better Performance Goal**—They feel automatic controls will improve mill performance in functions involving manual skill, that standard programs will improve mill performance in functions involving judgment.

To get uniform rolling, steel producers long ago began to program the settings of big reversing mills.

The first application of automatic screwdown dates back at least to 1927. In 1937, The Electric Controller & Manufacturing Co., Cleveland, supplied a system for pre-setting screwdown on a plate mill at U. S. Steel's Homestead works.

Since then, EC&M has supplied 50 units for automatically controlling screwdown of reversing mills. This has been done by means of a panel with sliding contacts.

The performance and relatively low cost of its control gave EC&M an armlock on the market for many years. Many steelmen favor the sliding panel today.

**All In The Cards** — Last year

# New Control Applications

## Physical:

### PUNCH CARD CONTROLS

**Applications**—Blooming mills; slabbing mills; reversing roughers; structural mills; plate mills

**Jobs performed**—Roll screwdown; roll speed; edger opening; mill delivery speed; bloom manipulation; scale breaker opening

**Status**—One reversing rougher now operating; at least nine more due.

### AUTOMATIC GAGE CONTROL

**Application**—Cold mills

**Jobs**—Automatic screwdown, first stand; speed and tension regulation, last or intermediate stands

**Status**—Some form installed on most tandem mills; use of load cells and speed variation alone being tried.

## TENSION COMPENSATION

**Application**—Hot strip mills

**Job**—Adjust screwdown and speed to reduce off-gage at tail end of strip

**Status**—One installed; others coming up.

## Informational:

### DATA LOGGING SYSTEM

**Applications**—Electrolytic tinplate lines; tandem cold mill

**Job**—Records total weight; off-gage; coating weight; pinholes

**Status**—One system installed on cold mill; one ordered for tin mill. All tinplate producers will probably install some form of data logging.

General Electric Co. and Westinghouse Electric Co. moved back into the picture with systems that use punched cards to apply screwdown and other settings. The new systems offer simplified setup; the card is just inserted in a reader. Many functions can be punched on a single card. The cards have the advantage (or disadvantage) of providing a rigid schedule.

First installation came last year on a 56-in. reversing rougher at Allegheny-Ludlum's Breckenridge plant. Here, a card control supplied by General Electric adjusts roll screwdown and roll speed. The operator pushes a button to start each pass. The control automatically sets roll separation for each time across.

**Punching It Out**—Punch card control will be carried several steps further by a Westinghouse system being installed on a reversing rougher at the Aliquippa works of Jones & Laughlin. The control card is punched for mill screwdown

opening; mill speed; draft compensation; edger opening; approach table; mill delivery speeds; scale breaker screwdown opening.

On a second J&L reversing rougher, in Cleveland, GE controls will provide the same type of fully automatic operation. Mesta is building both mills.

Another big first for card programming may come at U. S. Steel's new blooming mill in South Chicago. The mill is being built by United Engineering & Foundry. It will have Westinghouse card programming and the Corporation is reportedly considering inclusion of automatic manipulation in the program. If this works out, blooms will be rolled, reversed, turned and aligned, all according to planned and automatically controlled steps.

Along with the new blooming mill, U. S. Steel is installing a complete structural mill at South Chicago. This is being built by Blaw Knox with card controls by GE. It will have over 20 functions that can be controlled by cards.

**Primary Mills First**—The U. S. Steel structural mill will be the most extensive single application of card programming, but the emphasis throughout the industry is mainly on primary mills and roughing mills. In addition to the reversing roughers at Allegheny Ludlum and J&L, card controls are being applied to a universal slabber at Inland Steel (GE), to a blooming mill in the East (EC&M) and to a slabbing mill at U. S. Steel's Gary works.

A lack of uniformity plagues rolling mills all along the line. In new card control installations, producers are dealing with this problem in two ways. First, they are keeping operators and manual controls on hand to deal with offbeat ingots and slabs. Secondly, they are reducing the number of non-standard pieces. They are also laying down ironclad rules for the preparation of finished steel.

Is all this worth while? Allegheny Ludlum feels it makes a big difference. The company believes the

new control on its reversing rougher is bringing definite quality benefits; that it is reducing scrap and promoting uniformity.

**Strip Correction**—In the operation of hot strip mills, no one has developed an economical overall control. But U. S. Steel's Columbia Geneva Div. has come up with one significant control device for a hot strip mill. Called a trailing end tension compensator, the unit reduced the sharp increase in thickness at the tail end of a strip from about 150 ft to 20 ft.

To effect the same correction, at least one other strip mill has been built with provision for automatic screwdown on two stands. The same company is figuring on a combination of speed and screwdown variation to maintain gage at the end of a strip.

**Gaging Tinplate**—Tandem cold mills have achieved a high degree of automatic control. For rolling tinplate stock, the 5-stand cold reduction mill at U. S. Steel's Irvin works was equipped by GE several years ago with two automatic gage controls. The first is called the coarse control and consists of an X-ray gage mounted after the first stand, and an automatic screwdown on the same stand.

When the gage picks up thick or thin stretches, the roll screwdown is automatically corrected. At the last stand of the mill a second correction is made by means of speed and tension variations. Prior to the Irvin installation, speed variation was made manually.

Weirton and other tinplate mills have installed rigs similar to the one at Irvin. Cold mills rolling sheet gages are usually equipped only for the coarse correction. The reduction on the last stand of these is not enough for the tension correction to operate successfully.

**Tension Is Used**—One producer has come up with a new approach for gage control on a cold reduction mill. There will be no screwdown correction on the first stand. Gage will be corrected entirely by ten-



**PUNCHING IN:** Workman inserts card in punch card controlled mill at the Brackenridge Works of Allegheny Ludlum. Most steel producers are installing or have installed some form of automatic controls in their mills.

sion variation. Speeds of stands two and three will be adjusted to give this variation. Intermediate stands are being used because of the high unit tension before the last stand.

Another method is being tried at one plant and studied at another. A load cell is mounted between the roll screw and the roll chuck. As pressure changes indicate off gage material, the control immediately adjusts screwdown to correct. The same system employs a tension compensator on the uncoiler. This operates within the narrow dead center range of the main control unit.

**Cards For Setup**—Probably the most intriguing new development for tandem cold mills has been the application of punch cards for initial setup. Card will crank in gage tension and other settings. Initial mill screwdown will be made manually but there is provision for automatic setting later.

Control men wonder about the

economic justification of a fully automatic card control for a cold mill at this time. However, no one will be surprised if some form of this type control is announced in the near future.

**Data Logging Gains**—Another very hot development right now is the data logging system for tinplate coil lines. Producers are now installing devices that will log the quality of tinplate as it comes off the electrolytic line.

A typical logging system will take off total footage, prime footage, mender footage, and reject footage. Under reject there will be a breakdown giving the footage under gage, over gage, improperly coated, improperly finished, and defective because of pinholes.

**Reprints** of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

# Gilsonite Project Opens Up Vast

**Moving the solid black material 72 miles by pipeline was a major project that took combined efforts of many organizations.**

**Its success means a new future for this and other similar materials.—By Tom Campbell.**

■ Several years' research and \$18 million later, gilsonite, a solid hydrocarbon, is being converted into high octane gasoline and high purity metallurgical coke.

The black raw material—known and mined for years—is now subject to new methods, new handling, and new end products. These are being officially applauded this week at Gilsonite, Colorado, near Grand Junction.

**The Payoff**—American Gilsonite Co., joint affiliate of Barber Oil Corp. and Standard Oil of California, has made a fetish of economy and efficiency in arriving at several "firsts" during the estab-

lishment of operating techniques. This attitude will now pay off.

Among the results of patience, heavy investment and cooperative pioneering are: new "wet" mining methods, a unique pipeline for slurry transportation; and a refinery that economically cracks the gilsonite into gasoline and pure coke.

**The Background**—Gilsonite has been mined by the company and its predecessor since 1904 at Bonanza, Utah, in the Uintah Basin. This basin holds reserves of 16 million tons. The material occurs in fissures varying from a few inches to 22 feet wide. The depth of these veins runs to 2000 ft. and mining has taken place to 1500 ft.

Previous to the operations and new products disclosed this week, the black material has been mined, ground, sacked, and sent to market by truck. It was and is used in the manufacture of ink, phonograph records, roofing felts, paints, varnishes, battery cases, car body sealers and electrical and thermal insulation.

## Behind the Gilsonite Project

Design concept for the Gilsonite project was the product of several agencies:

Development of the ore cutting and removal methods by American Gilsonite personnel.

Pipe line transportation slurry suggested by Standard Oil Co. of California's engineering department.

Test work to develop the flow characteristics by the Colorado School of Mines Research Foundation, Inc.

Full scale pumping tests conducted by Standard's Engineering Dept. and Wilson-Snyder Co., Braddock, Pa.

Pump station designed by American Gilsonite's engineers and Ehrhart and Associates of San Francisco.

Slurry preparation plant by Allen and Garcia of Chicago and designed by F. C. Torkelson Co. of Salt Lake City.

Facilities for melting Gilsonite designed by California Research Corp.

Foster Wheeler Corp. designed and built the delayed coker.

H. K. Ferguson designed and built the catalytic reformer.

Process designs for coke calcining facilities supplied by Petrocarb Equipment, Inc. Kaiser Engineering engineered and constructed facilities.

Standard of California's engineering department is responsible for all other plant design, assisted by Kaiser engineers, in addition to the firms mentioned above.

**How It's Done**—Mining is done by two methods after shafts are sunk in veins of gilsonite. From either side of the shafts, drifts or tunnels are dug, the material mined and slushed down the shaft. It drops to the bottom and is pumped up to the top of the ground.

One method uses water under pressure to break up the hydrocarbon via tiny fissures in the ore. Another method developed by the company uses long rotary drills armed with carbide tipped teeth. Streams of water pass through the teeth, keeping the ore constantly wet. Explosion hazards are practically eliminated by the wet processing.

**Problems Solved** — Material which is to go through the 72-mile pipe line and over a mountain range to American Gilsonite's refinery is screened and sized. Long and important research on slurry transportation by pipe line indicated that 8-mesh sized particles are the best for use in the line. From a pumping standpoint this size produces much better results than ¼ in. particles.

Big hurdle faced in transportation: 72 miles of the most rugged terrain in the country; a maximum elevation of 8400 ft.—a rise of 3500 ft. in less than 40 miles, or 2000 ft. in six miles; two major canyon crossings by suspension bridge. Today the line delivers 350 gallons of mixture a minute at the discharge end. It operates continuously with a slurry 35 pct gilsonite and 65 pct water.

**Questions Answered** — The \$2 million, 6-in. pipe line settles such questions as: What happens if the flow stops? Will the solids slide to the low places and plug the line? What about power failure? Is corrosion and wear high? All of these queries and many others were solved by research and pilot studies before the commercial slurry was



# Potential

put through the line.

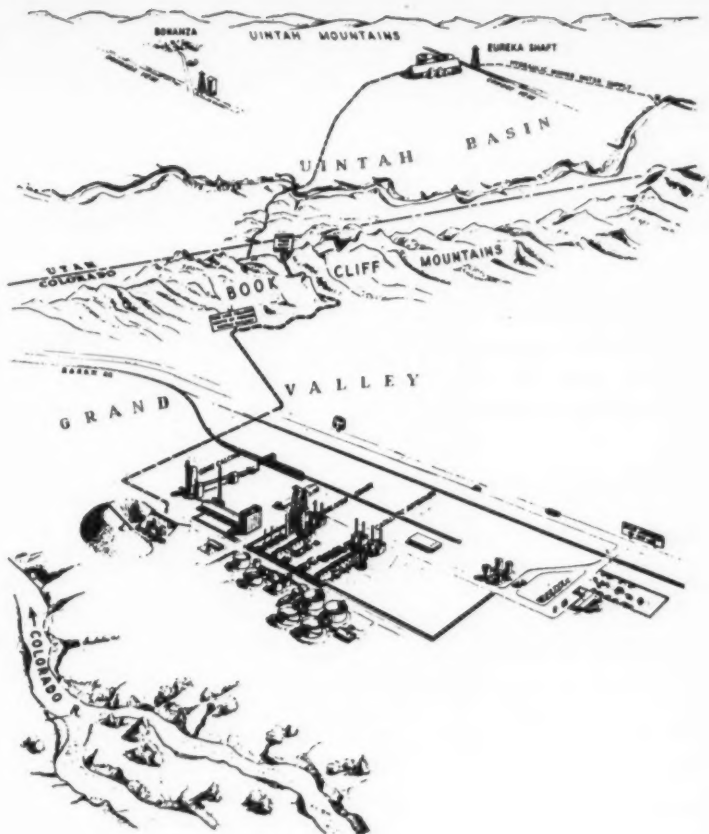
If there is a power failure, a diesel engine would cut in and flush the system with water. Plugging has been overcome by keeping the slurry moving at a relatively high velocity—for pipe lines.

**Emergencies Met**—A complete failure would be taken care of by flushing the system in either direction from a reservoir at the mountain top. Corrosion is kept to a bare minimum by removing free oxygen from the slurry with sodium sulfite. This research utilized a radioactive section of pipe in a test line.

**The End Product**—The slurry is dewatered after it leaves the pipe line at the refinery near Grand Junction, Colorado. It goes through a melting process to produce feed for subsequent operations. Using a delayed coker and catalytic reformer, the plant converts the solid brittle gilsonite into 50 pct. by weight, green coke; 35 pct gasoline; and 15 pct 1400 BTU gas—used as a plant fuel. The coke is calcined—cured—at the refinery.

The refinery handles 700 tons of gilsonite a day with 150 employees. Daily production is 1300 barrels of high-octane gasoline which is marketed in the Colorado area; 275 tons of high purity metallurgical coke, practically sulfur-free, which is sold to aluminum producers and other specialty carbon users; and 1400 BTU gas used in the process.

**Rewards To Come**—A side effect of this modern mining, transporting and cracking of an older material is summed up neatly by Ernest F. Goodner, president of American Gilsonite Co. Says he, "This refinery proves the economic feasibility of deriving petroleum products from other than conventional sources. We believe this opens up unlimited possibilities for the vast quantities of petroleum-like materials."



**BIG PICTURE:** Artist's conception of American Gilsonite Co. mines at Bonanza, U., showing two of the veins, and refinery in the Grand Valley, Colo. Dotted line marks route followed by pipe line for transporting gilsonite ore, in a slurry, from the mines to the refinery.



**SUSPENDED:** Pipe line suspension bridge, 700 ft long, crossed the White River near Bonanza, site of Gilsonite mines. A similar 600-ft bridge crosses Evacuation Wash Canyon about a mile away. Pipe line crosses rugged terrain up to 8400 ft elevation in its 72-mile length.

# Steel Takes Its Case to Congress

## Administered Prices Are Under Fire

**The steel industry won't have to plead the 5th Amendment when it goes before Senate subcommittee.**

**It can make a case why present wages and expansion costs must be paid for by higher prices.—By G. J. McManus.**

■ Beginning Aug. 6, a confusing and conflicting barrage of figures will stream in and out of Washington. Congressional hearings on the steel price increase will begin with U. S. Steel Chairman Roger Blough.

Basic question in the hearing will be: Did steel producers have to raise prices \$6 a ton on July 1? Could they have made a reasonable profit without the hike?

**Matter of Principle**—Arguments on both sides will center on principles as well as facts. The steel industry will challenge the depreciation laws under which it operates. The industry will defend its use of "costless capital."

This is not to say there will be

general agreement on matters of fact. The investigating subcommittee has invited 10 steel companies to submit written arguments. It has indicated it will call on the United Steelworkers for its views. It has already heard five economists.

**Poles Apart**—With this lineup, the halls of Congress will resound with contradictory statements. Industry spokesmen will say employment costs went up 21¢ an hour July 1; union spokesmen will say the wage increase was around 16¢ an hour. Industry will say employment costs rose 238 pct from 1940 to 1956. Labor economists will say real wages went up only 48.3 pct in roughly the same period.

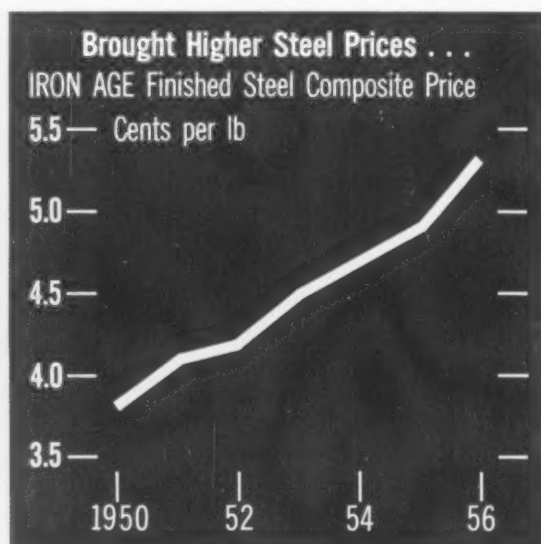
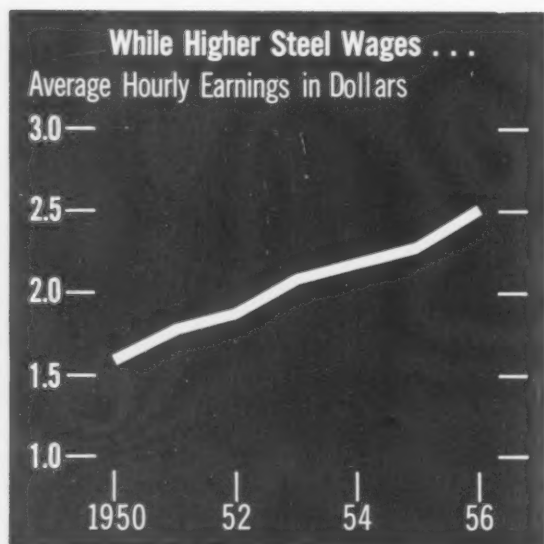
For the most part, these disparities are due to the fact that people are talking about different things: Labor pay on the one hand and labor cost on the other; gross wages and "real" wages. There is no big conflict once the basis for figures is nailed down.

**Why Not Absorb?**—Steel spokesman will be able to show there was

an increase in their employment cost of over 20¢ an hour July 1. Making a 3 pct productivity allowance, they will show these figures meant a 6 pct increase in the labor cost of making steel.

Industry spokesmen will say this cost increase could not be absorbed out of profits, that steel margins have been in line with, or below, other industries. According to the First National City Bank of New York, steel earnings as a pct return on investment have averaged 10 pct over the past 17 years. This compares with a 13 pct return for all manufacturing during the same period. Last year, steel's return was 13.9 pct, which was the same as the general average.

**Earnings Less Than Average**—According to the same source, steel's return on investment was below that of 15 other industries. On the basis of earnings in relation to sales, steel's 17 year average was 5.7 pct against 5.9 pct for all manufacturing. Ten other major industries made a better showing than steel in 1956.



Source: Bureau of Labor Statistics

There is some disagreement about some of the overall figures, but it can certainly be shown that many big industrial groups are making bigger profits than the steel industry without drawing criticism. The really big hassle will come in the analysis of steel costs and earnings.

**Expansion Argument**—The contention is made that steel prices are being raised partly to provide money for the mills to build new plants. In effect, say critics, consumers are paying for the cost of new steel mills. The mill stockholders put up no more money but the value of their investment increases. The term, "costless capital," has been applied to this notion.

The steel industry's answer to this thinking is that it is legitimate and necessary to use a portion of earnings for growth. That's the way the country has developed, say steel men. They say their earnings have not provided enough cash to pay for half the modernization and expansion outlay of the past 10 years.

**Financing Picture**—From 1947 to 1956, the steel industry spent \$8 billion on new or better facilities. Steelmaking capacity was increased 46 pct. About \$3.9 billion of the outlay came from earnings.

The long term debt increased by \$800 million during the 10 year period. The remaining amount came from stock sales and from cash generated through fast amortization.

The practice of plowing earnings back into the business is not peculiar to steel. "I think all well-run industry has paid out less dividends than they've earned in order to build up reserves for the future," said outgoing Treasury Secretary George Humphrey recently. The current trend is toward retaining a larger percentage of income (THE IRON AGE July 11, p. 71).

**Executive Opinion**—The committee will get a full rundown on steel's future need for cash. Fast tax privileges are running out. Depreciation allowances are too low to meet the expense of maintaining existing plants. The industry is reaching a point where it must build completely new integrated facilities.

J. L. Mauthe, chairman, Youngstown Sheet and Tube Co. contends: "You just can't have an industry and starve it. Our industry must continue to grow. But it can't if it is starved financially. I think the latest steel price increase was modest. Using 1950 as a base, wages have gone up 70 pct—as high as 77-78 pct—while prices have increased 40 pct. Our costs of

materials and services also have risen. You just can't build mills unless you have the money to do it with."

**Expansion Price**—In this connection, probers will be told it takes \$300 an annual ton to build a new mill. They will hear that a new pipe mill in the Southwest with a capacity of 1 million tons would cost anywhere from \$200 million to \$400 million. They will be told that a new mill would operate at a loss for at least 3 years.

With this in mind, the mills will say they must have prices that provide fair profit margins.

**The Summation**—If labor costs go up faster than productivity, the only way to maintain margins is through higher prices, say steel men. From 1940 to 1956, the steel industry figures its employment cost rose from 90.5¢ an hour to \$3.058 an hour. The increase was 238 pct. A portion of this was equalized by productivity increases, which are estimated at 3 pct a year. Steel prices went up 151 pct.

The price increases have not fully covered cost increases, say the mills. They say they are in profit squeeze which is partially obscured by depreciation policies. Under existing tax laws, steel mill equipment is depreciated on the basis of original cost.



Source: IRON AGE Financial Analysis

## Sen. Kefauver Says—

"Based upon the testimony of eminent economists . . . much of the present inflationary spiral appears attributed to price increases in administered price industries.

"There was substantial agreement . . . that the Administration's tight money policy can have very little influence in holding down price increases in administered price industries since the large companies can, and do, raise prices even when demand is falling.

"No better example of this behavior can be found than that exhibited by the steel industry itself. Because of this reason, and also because of its importance as the nation's basic materials industry, the subcommittee has chosen steel as its first specific field for examination."

# Industry Goes For Paper Wipers

## A Step Forward In Maintenance Economy

**On the production floor and in the inspection crib, paper is passing the test.**

**Its advantages are pointed up candidly by a trial run in a bearing maker's plant.**

■ Growing use of paper wipers in metalworking may soon relegate to the hall of memories the familiar picture of a machinist with a wad of textile waste dangling from his hip pocket.

This newest contribution by the paper industry to machine shop good housekeeping has only scratched the surface of its potential market. Available only within the past few years, paper wipers for cleaning chips, oil, and grease from machinery are becoming a standard item in many plants.

**Money Savers**—One large producer, Scott Paper Co., reports it

sold \$1 million worth of industrial paper wipers in 1954, the first year it marketed them on a national scale. Sales have been climbing steadily since then. In the first six months of 1957, sales were 31 pct ahead of the same period last year.

Many of the first companies to try paper in place of rags or waste report that paper does everything textile wipers can do and more. And they are more economical, to boot.

**What They Do**—Here are some of the advantages: laundry, sorting, and bundling costs are eliminated; disposability reduces fire hazards; less danger of worker injuries from chips imbedded in wipers; lint-free feature.

At Federal-Mogul-Bower Bearings, Inc., Lancaster, Pa., a switch from textile to paper wipers resulted in a \$33 monthly savings in the Automatics Dept., and an \$18

monthly saving in the Assembly and Packaging Dept. An additional monthly saving of \$20 is realized by the company in laundry charges previously paid for cloth wipers.

**Test Run** — In a three-month trial at Federal-Mogul-Bower, paper wipers were used exclusively for most machine tool operations. Management checked specifically to see how they were accepted by machine operators, foremen, and inspectors; if they helped solve housekeeping problems; if they were safer for personal use or from the standpoint of not having combustible materials lying around the plant; and lastly, if there really was a cost saving. The answers were affirmative on all points.

"They are preferred to cloth wipers because they do a comparable job, are less messy, and employees keep the plant cleaner than before," a company official says. An added safety margin is also provided with paper wipers, he points out, because disposal is facilitated by burning used wipers daily. Previously, accumulations of oily rags were always a fire hazard.

**Chemical Treatment** — Federal-Mogul-Bower plant No. 2 had been using an average of 8000 cloth wipers a month, which, at 1¼¢ each, cost \$100 a month. During the trial, 180 boxes of paper wipers did the same job at a cost of \$72 a month.

Most industrial paper wipers are treated chemically to give the paper added wet strength and resistance to disintegration when soaked with a solvent or oil. Scott Paper Co. puts out a paper wiper that is embossed for greater absorption. Hundreds of tiny perforations per square in. add to its soaking-up action.

The lint-free feature is especially desirable for inspection work.



**MACHINIST'S HELPER:** Paper wipers take their place alongside oil can and sand soap as a mechanic's universal accessory.



## Big First Half For Big Three

Big Three automakers' cash registers jingled merrily to the tune of nearly \$11 billion in the first six months of 1957. For Ford and Chrysler it was the boomingest first half ever. At GM it was only behind record-breaking 1955.

Chrysler sales soared to \$2,061,-047,392 for the period, up a whopping 44 pct over sales of \$1,428,-779,605 a year ago. Sales of Ford products leaped 27 pct to \$3,009,-500,000, marking the first time Ford has topped the \$3 billion in any half-year period.

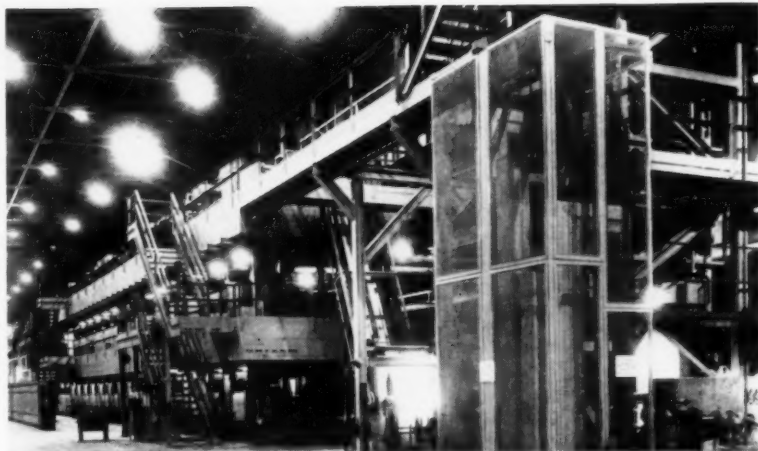
**GM Still Biggest**—Despite lower domestic production of vehicles, GM's dollar volume still exceeded the combined totals of its two rising competitors with a total of \$5,914,-000,000. This compares with GM sales of \$5,869,000,000 for the first six months of 1956.

Ford's net earnings for the period were \$171 million, 30 pct above the year ago figure. Earnings per share amounted to \$3.15 in the first half of 1957 and \$2.44 in the first half of 1956.

**Accessories Add Up**—Net income for GM totaled \$481 million for the half, down slightly from \$503 million a year ago. Earnings on common stock, after deducting dividends on the preferred stocks, were equivalent to \$1.71 a share. A year ago they equalled \$1.80.

But once again it was Chrysler that made a spectacular showing. Chrysler's earnings were \$89.7 million, equal to \$10.28 a share. This compares with only \$18.6 million, or \$2.14 in the first half last year. Highly significant is the fact that Chrysler earnings equaled 4.35 pct of sales compared with 1.31 pct in the same period of 1956.

The strong dollar sales volume showing of automakers can only partially be explained by higher price tags on this year's cars. A large part of the increase results from demands for costly optional equipment.



**TIN PLATE:** New Youngstown electrolytic line operates at 2200 fpm.

# Backup Rolls Drive New Tinplate Mill

**Innovation at Youngstown Sheet & Tube's temper mill is one of many.**

**Company engineers cooperate with mill builder to produce an industry showpiece.**

■ One of the fastest electrolytic tinplate lines in the industry made its public debut last week at the Indiana Harbor works of Youngstown Sheet & Tube Co. The plating line, heart of a complete new tin mill, operates at speeds up to 2200 fpm. Normal speed is 1750 fpm.

Youngstown's No. 2 tin mill at Indiana Harbor is a showpiece of modern engineering and automation in the production of tinplate. In operation for three months, it is the latest step in a continuing program of modernization and expansion at Indiana Harbor.

**Talents Pooled**—Also under construction is a new seamless tube mill which will begin production some time in the third quarter. A new sintering plant is in the works, probably will be close to production within the next two years.

A. S. Glossbrenner, Youngstown's president, pointed to a unique feature of the tinplate plant's temper mill. This mile-a-minute 4-high 2-stand mill is driven by the large 52-in. wide by 56-in. diam backup rolls, which bear against the face of the smaller work rolls. On older mills of this type the work rolls are driven individually. The idea was brain-stormed by Youngstown engineers and incorporated into the mill in cooperation with United Engineering & Foundry Co., the mill builder. It makes possible the use of smaller work rolls and minimizes wear and tear on mill bearings.

**Continuous Annealing**—Another outstanding feature is a continuous annealing furnace which will operate at speeds of 500 to 750 fpm. The tin mill is housed in eight connected buildings covering 419,655 sq ft on what was once a lake. Ground was broken May 17, 1955.

Since the war, Youngstown Sheet & Tube has invested more than \$390 million in new and improved facilities at its Youngstown and Indiana Harbor operations.



HOW RAILROADS HOPE TO FINANCE IMPROVEMENTS — SCHEDULE OF UNIT RENTALS

Type of Equipment	Unit Cost	Present Day Scrap Value	Cost to be Amortized	Term of Lease	Annual Return on Scrap Value	Annual Amortization	Annual Rental Due under Lease	Rental	
								Monthly	Daily
Freight Cars	\$ 8,500	\$1,250	\$ 7,250	20 yrs.	\$50.00	\$ 527.20	\$ 577.20	\$ 48.10	\$1.60
Diesels	200,000	7,000	193,000	15 yrs.	280.00	17,131.16	17,411.16	1,450.93	48.37
Passenger Cars	140,000	4,500	135,500	10 yrs.	180.00	16,462.46	16,642.46	1,386.87	46.23

## Railroads Ask Federal Financing

**Eastern railroads have big problem of financing needed rolling stock.**

**New plan asks giant Federal equipment trust for freight and passenger cars and locomotives.**

■ The eastern railroads have asked Congress to create a giant Federal agency to finance large purchases of freight cars, passenger cars and locomotives.

The plan had been under study for some time by the railroads in eastern U. S. who, in spite of a great need for additional rolling stock, are hard pressed to finance equipment trusts. (See THE IRON AGE, May 23)

**34 Roads Covered**—The plan was presented last week to the House Committee on Interstate and Foreign Commerce by James M. Symes, president of the Pennsylvania Railroad, on behalf of 34 eastern roads.

Railroads in other areas of the country are less tightly squeezed for financing and pressure so the proposed Federal agency is confined to the eastern seaboard.

Specifically, Mr. Symes asked a self-supporting agency to lease roll-

ing stock to the railroad industry, "immediately providing new locomotives, freight and passenger cars which the nation requires for peacetime progress and national defense."

**Capital Needed**—He said a "new reservoir of capital" is needed by the railroads. Less than half of the true needs for new railroad equipment can be met by existing sources. He contended that low earnings have "practically eliminated any chance of equity financing."

The proposed Railway Equipment Agency would be provided with initial capital of \$500 million, and would be authorized to borrow four times that amount. Railroads could apply to the agency for long-term net leases for equipment needed, with a fixed term for lease for each type.

**Defense Factor**—The roads contend the plan would not cost the government anything, that it would assure the railroad industry would be maintained in first class condition.

Since cars could be turned over to the strategic materials stockpile after leases expired, the government could have a stockpile if an

emergency develops.

No immediate or even early action is expected on the proposal. Congress is not in a position to consider formal action this session. What the proposal does is place the railroads on record with their recommendation for action, along with a statement of their equipment needs.

**Effect on Car Builders**—Outlook for rail car builders is unchanged. If anything, car orders, particularly from the eastern railroads, may slacken while the proposal is considered. However, many railroads with stronger earning records than the eastern roads are able to obtain advantageous financing and will continue their programs.

On July 1, backlog of freight car orders stood at 91,810. Orders for June totaled 4918 compared with deliveries of 8377. However, if financial aid in financing could be obtained, there is no doubt but that eastern railroads, particularly the three major lines, Baltimore & Ohio, Pennsylvania, and New York Central, would jump in with orders of large size.

The fact that the proposed trust would involve upwards of \$2 billion indicates the magnitude of orders the roads have in mind.



"Why substitute? The best metal  
for screw machine parts is still brass...  
and it costs less!"

**Titan Brass Rod**

**REDUCED 30%**

Price of Titan free-cutting brass rod today is reduced over 14 cents per pound, or 30% from April 5, 1956 . . . from 47.51 cents per pound to 32.87 cents per pound on July 18, 1957.

Be cautious about substitution claims. Remember these advantages of brass:

- Brass is the most easily machined of all metals . . . giving low costs and high output
- Brass allows trouble-free maintenance on screw machines
- Brass has natural fine surface for high polish and ready plating
- Brass gives maximum production efficiency . . . eliminates extra operations
- Brass is corrosion-resistant
- Brass scrap has the highest market value of all common metals

It all adds up. Brass gives you your metal money's worth! And brass costs less. Call Titan today!

**Titan**

**METAL MANUFACTURING COMPANY**

Bellefonte, Pa. Elgin-5-4712

Depots: Bellefonte and Indianapolis

Offices and Warehouses in Principal Cities

**TITAN BRASS FOR FORGINGS AND DIE CASTINGS HAS BEEN REDUCED PROPORTIONATELY!**



**ATOMIC SURVIVOR:** While adjoining house collapsed in Nevada atomic test stamping press was unshaken and apparently ready for operation.

## Some Housing Pickup From New Law

The new housing bill passed by Congress is almost sure to give home building a boost. But it won't be a cure-all for the problems caused by tight money and rising costs.

Some pickup in home building, appliances and building equipment will probably become apparent over the next six months. A return to the boom of 1955 will have to wait for fundamental changes in the economy. That's the opinion of top government housing experts.

**Lower Down Payments** — The new housing law allows sharp cuts in the minimum down payments on government-insured home mortgages, ranging up to 50 pct on lower-priced homes. It also authorizes \$1.2 billion in government funds be pumped into the home mortgage pipe line.

Builders agree that a simple cut in down payments isn't the answer. The tight money market and high interest rates still make other types of investments more attractive.

**Higher Interest Rate**—The gov-

ernment will probably increase by about  $\frac{1}{4}$  of 1 pct the maximum interest rate which can be charged on FHA-insured mortgages. The rate has held at 5 pct for many months.

Builders hope this increase will attract more capital.

## SBA Lends More

Loans granted to small firms by the Small Business Administration in this fiscal year topped last year by 85 pct.

During the 12-month period ending June 30, 1957, SBA approved 3536 loans to small business, totaling \$159,095,000. During the previous year only 1915 loans for a total of \$81,977,000, got a stamp of approval.

**For Disaster** — Disaster loans slackened off in 1957, totaling \$12,992,000 compared to \$44,402,000 on 3309 loans in the previous fiscal year.

Since the start of the lending program on Sept. 29, 1953, the Small Business Administration has approved 7096 loans to small firms for \$324,786,000, and 6149 disaster loans for \$66,009,000.

## New Acme Steel Mill

When Acme Steel Co.'s new cupola-oxygen converter steel plant starts up late next year, the company will be 70 pct independent of outside sources of billets and slabs for the first time in its 77-year history.

The new plant, which will produce 450,000 ingot tons of steel annually, will cost \$23 million. Besides two hot blast cupolas and two oxygen converters, new facilities will include a billet mill and a blooming mill. Provision has been made for further expansion of ingot capacity. There is room to expand to supply 100 pct of billet and slab requirements.

**Capacity**—Iron capacity of the cupolas will be 1200 tons per day. The oxygen converters will each have a capacity of 50 tons. Conversion of iron to steel takes about 35 minutes.

The new plant, at Riverdale, Ill., will include five buildings, approximately  $3\frac{1}{3}$  acres containing the steel-making process; and a separate group of buildings covering 4 acres containing ingot heating furnaces, blooming and billet mills. An air separation plant will provide 110 tons of oxygen per day.

Construction cost is estimated at \$51 per annual ingot ton.

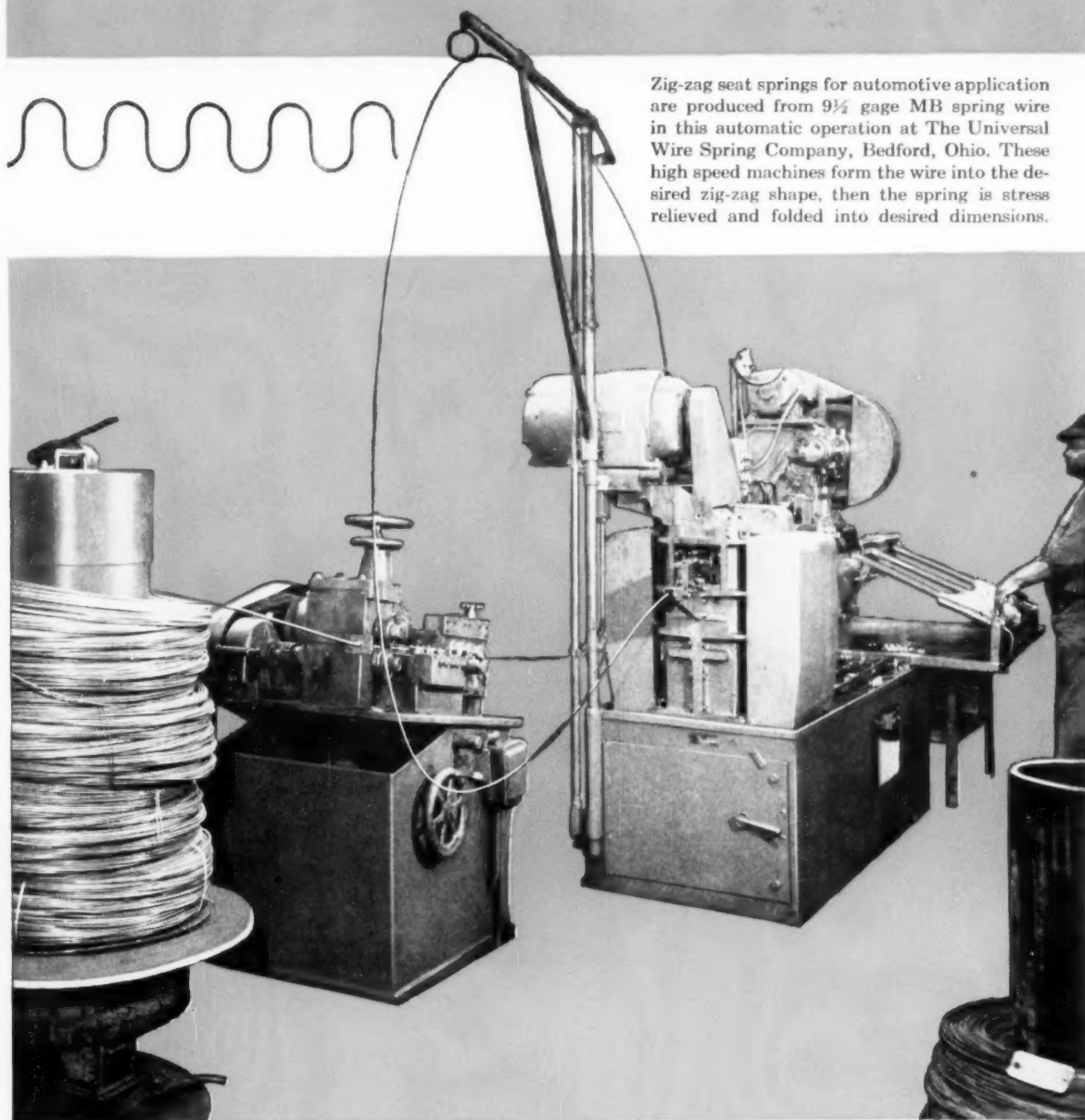
## Reynolds' Extrusions

A new aluminum fabricating plant, with a capacity of about 2 million lb per month, has been dedicated by Reynolds Metals Co., at Bellwood, on the outskirts of Richmond, Va.

The plant is primarily an extrusion operation and cost Reynolds \$5.5 million to build. It features four, 2300-ton extrusion presses to turn out parts for storm and prime windows, ladders, chairs, electrical applications, etc.

In addition to extrusion facilities, the new plant has modern casting equipment, a die manufacturing machine shop, an inspection dept., metallurgical laboratories, and a shipping dept.





Zig-zag seat springs for automotive application are produced from 9½ gage MB spring wire in this automatic operation at The Universal Wire Spring Company, Bedford, Ohio. These high speed machines form the wire into the desired zig-zag shape, then the spring is stress relieved and folded into desired dimensions.

## **AUTOMATIC production requires AUTOMATIC quality of J&L SPRING WIRE**

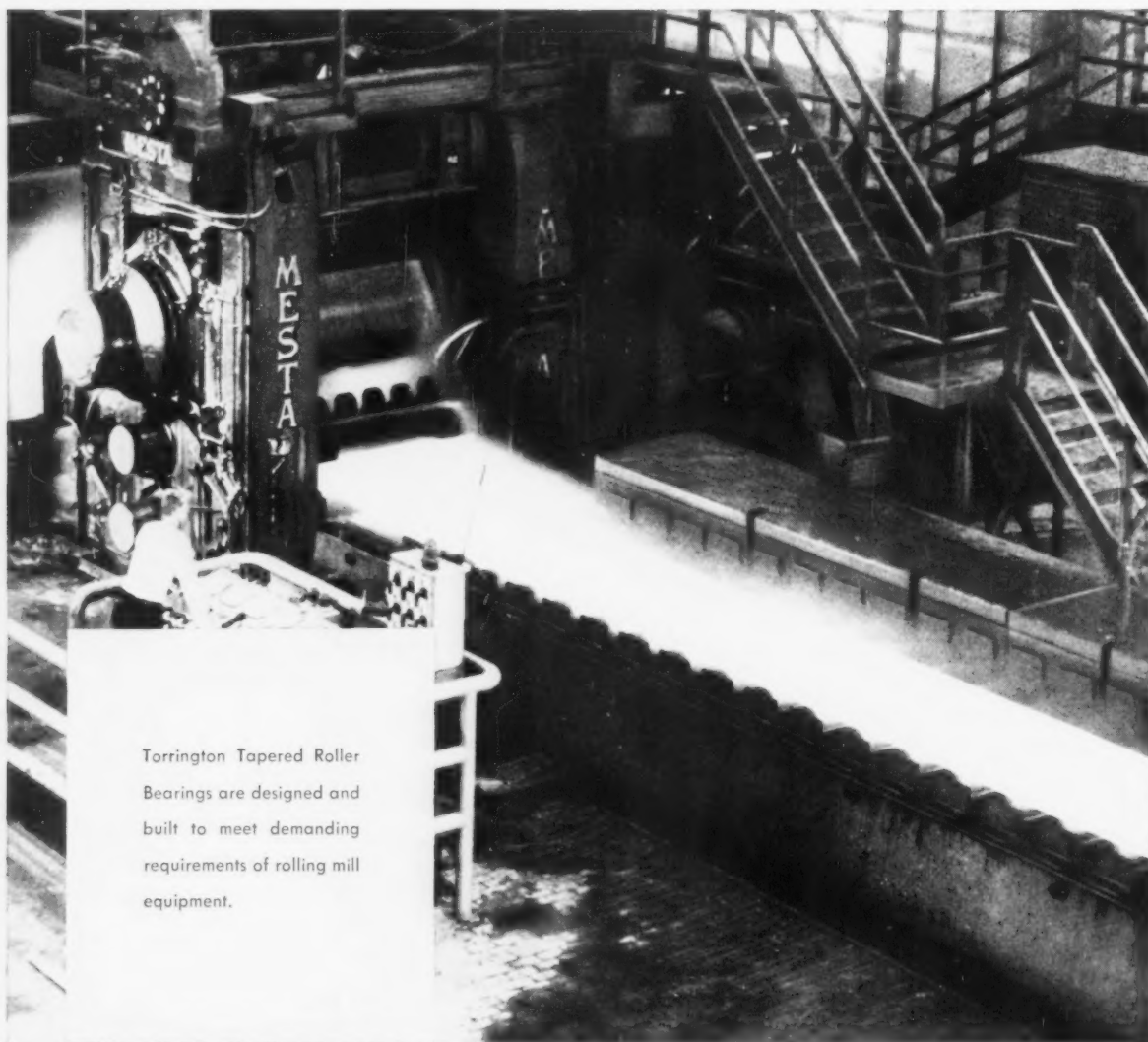
Every coil of J&L spring wire is thoroughly tested for uniformity of physical and dimensional properties. This uniformity of J&L's famous Mastercraft, hard-drawn MB or Electromatic oil-tempered MB spring wire speeds production, reduces rejects, in automatic operations.

J&L exercises rigid quality control in every phase of production from ore mine to finished product. J&L wire is tops in quality . . . competitive in price.

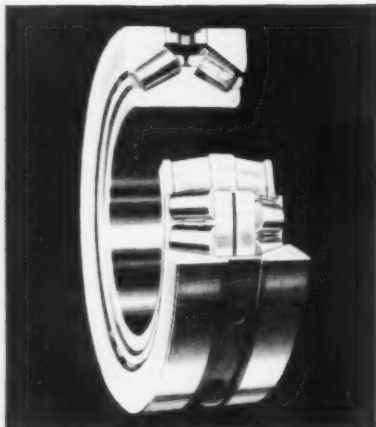
Call your J&L representative the next time you order spring wire. Or write direct to the Jones & Laughlin Steel Corporation, Dept. 403, 3 Gateway Center, Pittsburgh 30, Pennsylvania.



**Jones & Laughlin**  
STEEL . . . a great name in steel



Torrington Tapered Roller Bearings are designed and built to meet demanding requirements of rolling mill equipment.



## Meeting Production Demands!

Today's heavy production demands on modern continuous hot and cold strip mills put back-up roll thrust bearings to severe test.

That's why you find so many Torrington Two-Row Tapered Roller Bearings in this service throughout the country. Operators have learned that they can rely on Torrington Bearings to roll out record tonnages with only routine maintenance.

Little wonder—steep-angle design gives them capacity to spare for handling heavy thrust loads. Only highest quality electric furnace, alloy-bearing steel is used, carburized and heat-treated for toughness, hardness, stability and uniformity. Precision workmanship assures even load distribution and minimum friction.

Torrington Two-Row Tapered Roller Bearings are available with either pin-type or cast-bronze, land-riding cages. Like Torrington Four-Row Tapered Roller Bearings and Spherical Roller Bearings, they offer performance you can rely on when production schedules demand the best. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

## TORRINGTON BEARINGS

*District Offices and Distributors in Principal Cities of United States and Canada*

TAPERED ROLLER • SPHERICAL ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST

Robert Potter

# A New Slant on Equipment Sales

**Planning a new building to accommodate heavy machinery isn't an easy job.**

**Anyone who has ever watched with anguish while a new wall was torn down will appreciate Mr. Potter's plan.**

■ After thinking about it for a moment, few would dispute Robert Potter's contention that the most important part of a modern plant is its equipment, rather than the buildings.

Therefore, he says, a new plant should be built around the equipment instead of the customary practice of erecting a building, then trying to make the machinery fit.

**A New Service**—Consequently, the young, energetic president of 100-year-old E. W. Bliss Co. is starting something new for a metalworking equipment builder. His plan is so logical you might wonder why someone hasn't done it before.

Bliss will actually build a customer's plant around its equipment on a contract cost basis, and will equip the plant fully with associated products needed to begin operation.

**Offers Technical Help**—"We are willing and able to do more than merely build machinery and ship it to customers' plants," Bob Potter says. The company has done this to some extent in the rolling mill field. But now he feels the time has come to extend the service to other fields as well—particularly can making machinery and metalworking presses.

"As companies expand and diversify," he says, "they often find themselves on unfamiliar ground.



**ROBERT POTTER:** A new plant should be built around its equipment.

The shortage of executives and engineers aggravates the problem. If we can take over and guide them, it will benefit not only them but us, as well."

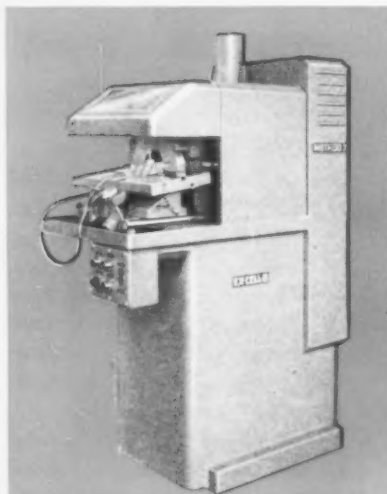
**Rapid Climb**—When he first joined Bliss in 1946 as chief engineer of the Rolling Mill Div., Bob Potter soon showed signs that he was an engineer who could rise far above the slide rule and look at the big picture. Five months after he joined Bliss, he was named works manager of the Salem plant. Shortly afterward, he was elected vice president.

Under his leadership, the division expanded its activities in the

rolling mill field. One feather in his cap is the acquisition of Mackintosh-Hemphill Co., which long has made metalworking rolls used in mills the world over. With his eye focused on new processes, Bob Potter led Bliss into the field of powdered metal rolling—a process which is growing more important each day.

Bolstering Bob Potter's confidence is a smoothly operating executive team and Bliss' century-old reputation. He feels that Bliss' long history of building special machinery opens the door to many contracts outside the company's regular product line.

# *No Diamonds Needed!*



Ex-Cell-O Style 43-A Method X Tool Sharpener uses inexpensive cast-iron disk in place of conventional, but costly, diamond-faced grinding wheel.

**XLO**

EX-CELL-O FOR PRECISION

## **Ex-Cell-O Method X Tool Sharpener Cuts Carbides Without Expensive Wheels**

**Compare the cost!** Diamond wheel cost in off-hand tool grinding runs eight to twelve dollars per cubic inch of carbide removed. Wheel expense with Method X averages only 20 cents.

**Compare the work!** Method X produces no thermal stresses—won't chip or score carbide tips. Both carbide and shank are removed simultaneously—no need grinding secondary clearances.

**Compare the operation!** Operators can handle Method X Machines without special training. No pressure on the workpiece means less operator fatigue. Cutting speed (comparable to diamond wheel grinding) and desired matte finish—simply a matter of setting a power selector switch.

For full information on Method X send today for your copy of Ex-Cell-O's illustrated Bulletin #43272. Or ask your local Ex-Cell-O Representative for one.

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MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT



# A Look at Motivation Research

**You have been reading a lot lately about motivation research. But what has it got to do with metalworking?**

**Evidence is building up that even manufacturers goods can benefit from motivation study.**

■ Even if you are in the hard core of metalworking, you probably have been exposed to some extent with the new marketing tool of motivation research.

Depending what you read and whom you talk to, you may have the idea that it's the greatest thing

in years—or you may dismiss it as a lot of Freudian claptrap.

Chances are, you probably believe it has a position in marketing consumers goods like cigarettes, soap or girdles, but hardly the thing for metalworking. You probably would make concessions in regard to appliances, but not to manufacturers goods.

**The Record Shows** — And you may be wrong. A substantial volume of evidence is building up that indicates it has a place in metalworking. Believe it or not, the hard-bitten purchasing agent or the tough production man who picks

his equipment may have his own motivation. A little research of the social science nature can find out.

Most discussions of motivation research start off with a definition. Deryl Case, Consultant—Marketing Research, at General Electric Co., says there is no established definition, calls it "any research designed to explain human behavior, regardless of the methods used." As applied to marketing, it means learning the underlying reasons, conscious or sub-conscious, why a person makes a specific purchase. This has led to the Freudian overtones that tend to overshadow the practical aspects.

## ... What GE Study Disclosed

**GE's Results** — An outstanding example of a restrained approach to motivation research is on record at GE, a company that is not known for taking flyers into never-never land.

This is no attempt to explain or document GE's motivation research program. But there is one case in particular that should be of interest to metalworking since it involves such a sexless product as direct current motors.

**How It Worked**—Citing the d-c case history, Mr. Case relates that about a year ago, GE's Direct Current Motor and Generator Dept. had a motivation research study conducted among people important to direct current equipment.

They included engineers, purchasing agents, company executives, technical editors. The department management had sensed weaknesses or barriers in marketing. It tried to determine: 1. What are the psychological barriers to greater

acceptance? 2. How can GE hurdle these barriers?

**Unconscious Rejection** — It got the answer. According to Mr. Case: "The key finding was that d-c's acceptance is being slowed by a time barrier. Although the respon-

dents view d-c as having one foot in the future . . . the majority consciously or unconsciously reject d-c as something from the past."

"It is associated with outdated trolley cars and early efforts to produce power, an anachronism in this day and age."

## ... Result: Better Sales

**Situation Corrected** — "GE's general strategy," Mr. Case suggests, "should be to bring it up to date for all, by strengthening present associations which link d-c with frontier developments in industry and weakening the associations which link it to the past."

Others feel that there is little possibility of further improvement in d-c, an emotional feeling rather than a belief. To counteract this, Mr. Case suggested GE should play up its research on d-c and give publicity to theoretical work and the constant search for new d-c

applications.

Following through, GE initiated an advertising campaign based on the study. "All these applications," Mr. Case reports, "were regarded by management as eminently successful . . ."

Motivation research, like many new developments in business and elsewhere, has been subject to much misinterpretation and no little satirization and ridicule. But it has already proved successful in marketing consumers products, and it now appears to be a valuable tool in marketing manufacturers goods.



**NOISE IN HI-FI:** Chrysler engineers make high fidelity tape recordings to test a noise deadening material.

## How Engineers Cut Auto Noises

**Almost nothing can ruin repeat sales more than a car that rattles as it rolls.**

**To insure quietness, automakers are lending keen ears to their sound engineers.—By H. R. Neal.**

■ Ridding a car of unwanted noises is a big problem. Automakers go to a great deal of trouble and expense eliminating these noises before designs are released.

Teams of sound engineers, using super-sensitive high fidelity recording equipment, are sent searching for discordant sounds with the gusto of the most exacting symphony conductor.

**Chrysler's Team**—In Chrysler Corp.'s engineering laboratories, J. R. Farnham, who heads the sound lab, says, noise is readily recognized when you hear a car going down the street without a muffler.

Yet, he points out, the energy of this noise is only about a billionth of a horsepower. Noise can come from parts which vibrate through a distance of less than a millionth of an inch.

**Elusive Quarry**—How do you find and eliminate the noise?

"Automobiles are clever ventriloquists," says Mr. Farnham. "And human ears have 'poor memories' for particular sounds. A rattle, bump, squeak or thump that seems to be in one place actually originates in another. Or it may be a complex sound from several sources."

Augmenting the sound engineers' own hearing is an array of sensitive electronic instruments. These include high fidelity tape recorders and players.

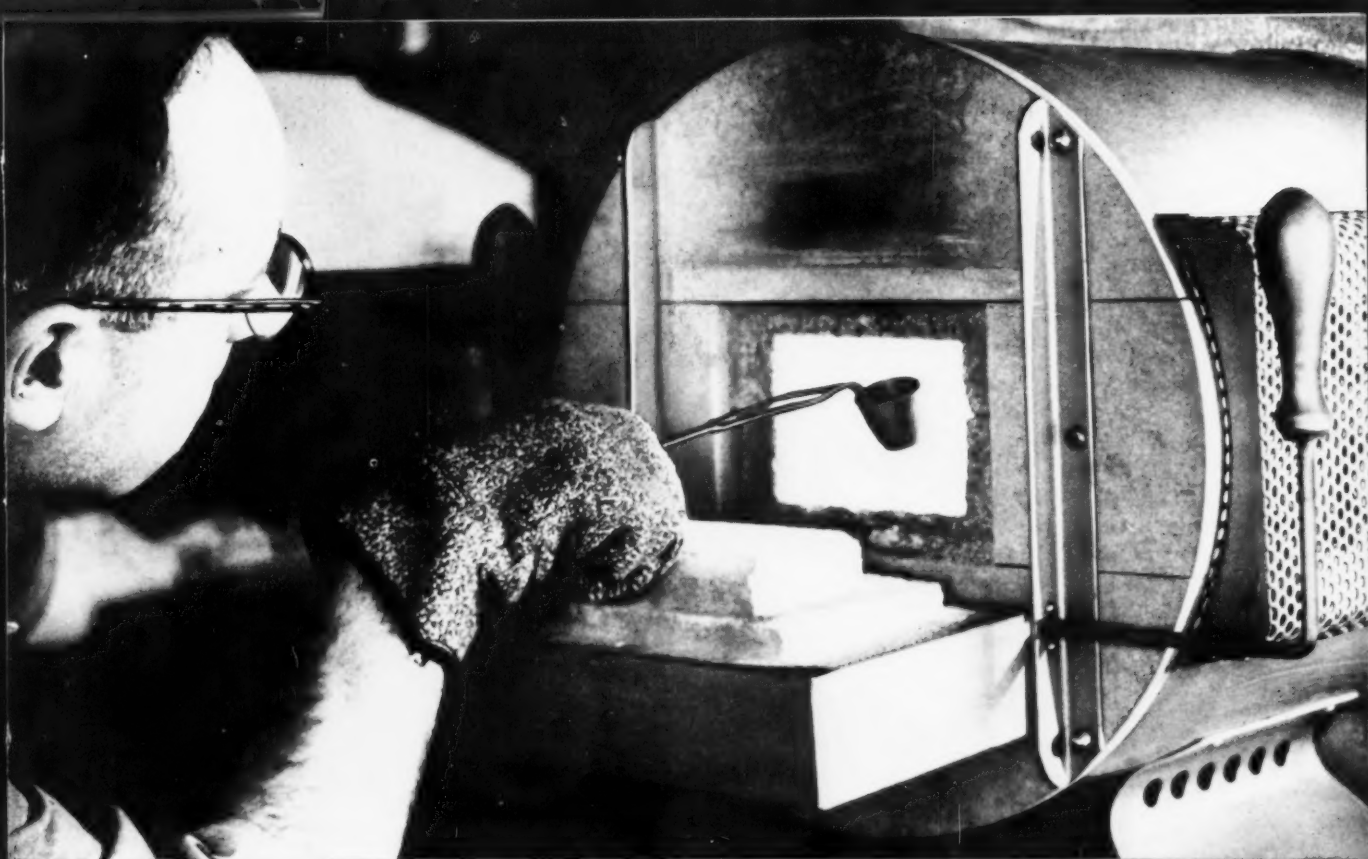
**The Decibel System**—Sound lab engineers and technicians measure the level of noise in units of deci-

bels, a logarithmic unit. A reading of 73 decibels, for example, is about twice as much sound energy as a reading of 70. It is ten times as much as a reading of 63. A low whisper from a yard away measures 20 decibels. The noise of a vacuum cleaner is 50 decibels. The threshold of pain is reached at about 120-130 decibels.

Great care must be taken to reduce every possible noise. A car has many sound producing parts. Just eliminating or reducing the noise from one major source is not enough.

**Corrective Steps**—The first step is to reduce noise at its source. This may involve tightening a part, replacing worn parts, or stiffening a component. Occasionally, design is at fault. Changing the spacing of blades in a cooling fan can produce pleasant purrs or unbearable noises.

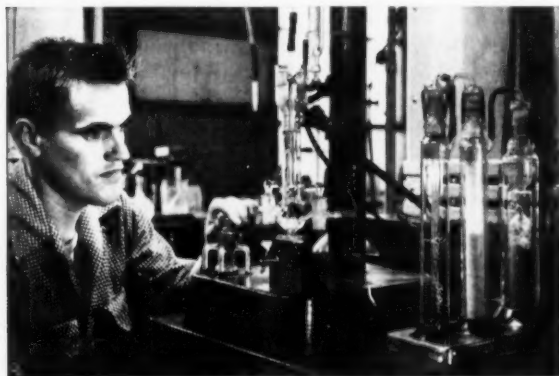
Isolation of vibrating parts is



## How Great Lakes Steel *blends* quality



COKE OVENS eject tons of flaming, quality controlled coke into cars for rapid delivery to quencher. Then . . .



SAMPLES ARE ANALYZED carefully to determine the amount of sulphur in the coke used in the blast furnaces.

Take five kinds of carefully selected soft coal. Blend well. Bake in a 2500° oven for 15½ hours. And if every step has been checked and double checked, the way it is at Great Lakes Steel, *presto!* You get pure, hard coke—the vital ingredient for reducing ore to high-quality pig iron.

Above, you see Great Lakes special coke recipe (cut in millionths, of course) being checked for ash impurities, a very important step in the complete analysis.

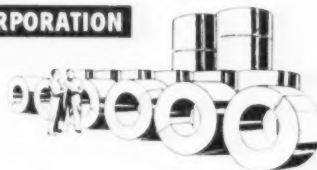
First, a sample of each kind of coal is burned to a cinder in the test furnace. Then the painstakingly mixed blend gets this dress rehearsal heat treatment, too. And this makes doubly sure that the blast furnaces produce quality iron . . . iron to make steel that meets customer specifications *to the letter!*

Quality control from raw materials to finished product—that's Great Lakes Steel! May we help you?

### GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • Division of

**NATIONAL STEEL CORPORATION**



District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

There's a Good Reason why  
**ZINC** DIE CASTINGS  
are so widely used

at

**TURNER & SEYMOUR**

it's

## ECONOMY

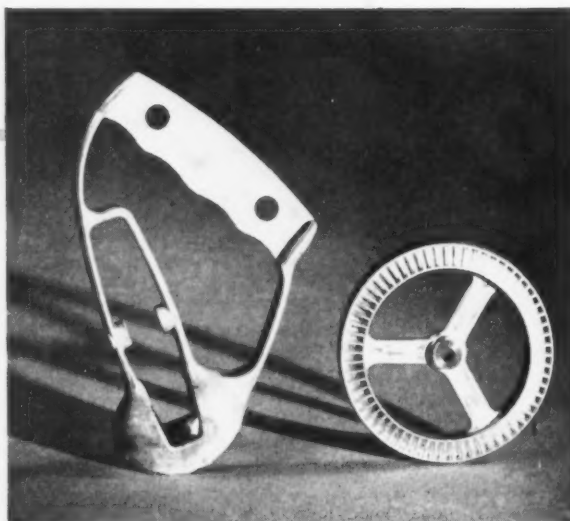
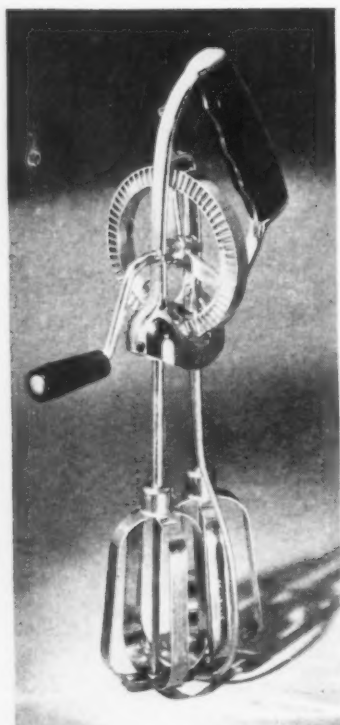
Two-piece construction instead of six for the frame, gear housing, shield and drive gear on this modern egg beater is an excellent pattern for major production economy and improved design possible with ZINC DIE CASTING. Built to a toolmaker's precision, this durable and smooth-running household necessity is made by The Turner & Seymour Manufacturing Company.

**LOWER PRODUCTION COST**—An assembly of stampings, used for older types of beaters, require six or eight parts instead of the two ready-to-use ZINC DIE CASTINGS.

**SIMPLIFIED ASSEMBLY**—The gear housing and cored holes for crank, beater shafts and gears are cast in the frame. Parts fit together accurately for simple assembly without machining.

**IMPROVED APPEARANCE**—The flowing, modern design and smooth finish of the castings provide a perfect base for a bright chromium plating accented by black plastic handle faces.

Any die caster will show you how these money-saving and quality-improving benefits can be applied to your products.



**THE NEW JERSEY ZINC COMPANY** 160 Front Street, New York 38, N. Y.



The research was done and the Zamak  
die casting alloys were developed with

**HORSE HEAD SPECIAL** (99.99 + %  
Uniform Quality)

**ZINC**  
FOR DIE CASTING ALLOYS



## Automotive Production

WEEK ENDING	CARS	TRUCKS
July 27, 1957*	120,074	21,449
July 20, 1957	117,205	21,993
July 28, 1956	111,247	21,426
July 21, 1956	113,416	21,706
TO DATE 1957	3,798,334	657,287
TO DATE 1956	3,581,218	669,262

\*Estimated. Source: Ward's Reports

another method of silencing. Rubber engine mountings between the engine and car frame keep vibrations from being transmitted to the passenger compartment.

Dampening vibrations is another solution. Fluid deadeners, heavy tar-like materials, are applied to metal panels to "damp" their vibrations. Roof panels are usually treated in this manner. Undercoating serves the same purpose on floor pans.

**Soaking Up Method**—Sound insulation is employed as well as isolation and dampening techniques. This involves building sound barriers between the source and passenger compartment.

Finally, remaining noise is absorbed. Porous materials soak up sound like they soak up water. Matted wood fiber, fiberglass pads, cotton and wool matting, and interior trim materials fall into this category.

**Jury Decides**—The ear is the final judge of how successful the silencing treatment has been. Chrysler engineers use high fidelity equipment to record the noise before and after treatment. A "sound jury" of engineers and average drivers listen to the before and after recordings in a special room. What they "don't" hear in the "after" recording is the key to success.

However, success sometimes presents more problems, as one sound engineer pointed out. Sounds that have been eliminated often muffled another harsher, unsuspected noise. Then the process starts over again.

As long as automobile models change from year to year there will be need for sound engineers and a market for new testing devices.

## Detroit Briefs

**GM Combines Staffs**—General Motors has formed a new Power Development Section, consolidating automotive engine research of the engineering and research staffs. Darl F. Caris has been named engineer in charge.

**Well Done**—Lincoln ended production of 1957 cars last week, joining Continental, Nash and Hudson which completed current model production earlier. The 1957 model year production of 41,123 units ranks as the third highest in Lincoln's history. Lincoln production ended about a month early to permit assembly of the new Edsel in the Wayne, Mich., plant. Starting with 1958 models, all Lincolns will be produced in the division's new facilities in Wixom, Mich.

**Scotsman Sells Out**—Studebaker-Packard Corp.'s economy car, the Studebaker Scotsman, is a success. Harold E. Churchill, S-P president, revealed the Scotsman has reached a "sell-out" position.

Churchill said all Scotsman models scheduled for the 1957 model run have been ordered by dealers. This is, he said, despite the fact that the original schedule was nearly doubled.

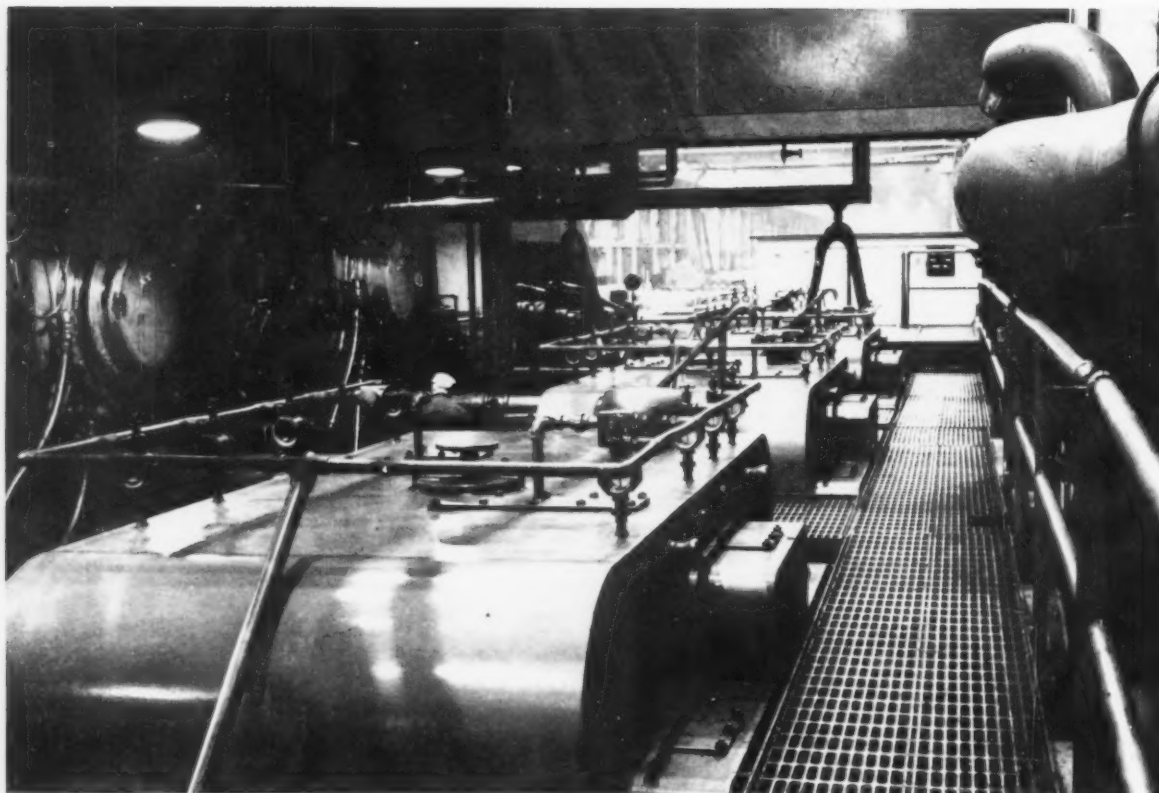
**Safety Is Popular**—Buick reports its buyers are demanding more convenience and safety accessories than ever before. During the first eight months of the 1957 model year power steering was installed on 64 pct of Buick production, up 12 pct over 1956. Power brakes were fitted on 59 pct of the cars, up from 46 pct a year ago. Windshield washers are installed on 78 pct and Buick's exclusive safety buzzer is found on 85 pct. Similar figures were recorded for other safety items — padded dashes, glareproof rear view mirrors and backup lights.

**More Mules**—U. S. Army Ordnance Corps has awarded five more Mechanical Mule contracts to Willys Motors. Willys now has Mule contracts totaling nearly \$6.8 million, covering engineering, research, production and parts.

## THE BULL OF THE WOODS

By J. R. Williams





## Steel strip whizzes through this new mill at 80 miles per hour...

It's a high-speed, cold reduction five stand tandem mill at Weirton Steel Co., Division of National Steel Corp. It rolls strip in widths to 48" by .008" thick. Gear drives are fully protected with *Texaco Meropa Lubricants*.

New steel mill equipment operates faster, carries heavier loads. That's why the long-lasting extreme pressure properties of *Texaco Meropa Lubricants* are so important in protecting gears and bearings from wear and damage. They cushion metal surfaces against shock or prolonged heavy loads.

*Texaco Meropa Lubricants* also contain exclusive polar additives that keep them where they're needed, even under conditions of severe heat, pressure or moisture. Moreover they resist thickening, do not

foam, won't separate, and are non-corrosive to gear and bearing metals. All good reasons why *Texaco Meropa Lubricants* help gear your mill to higher efficiency.

Let a Texaco Lubrication Engineer give you further details. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



**TEXACO Meropa Lubricants**  
FOR STEEL MILL GEAR DRIVES

# Get Ready for Price Escalator

## And New Wage Demands Aren't Far Behind

**Climbing costs of doing business aren't something new, but there's little hope for any early end.**

**Labor will be alert to capitalize on the trend for new demands.—By G. H. Baker.**

■ Keep in mind that just about everything your firm buys is going to cost more in the months ahead. The new steel prices that became effective recently are only part of the inflation story.

Higher prices are being put into effect up and down the line in dozens of different basic industries.

Fabricators and others who must deal with sellers of basic industrial commodities will have to take their choice: Either pass on the higher costs to customers or absorb all or part of the increase.

**More to Come**—Labor leaders, noting the upward nudge in the general level of prices, are planning to present new wage demands. (Fact that several big industries have labor contracts that aren't due to expire for another year or even two doesn't matter. Union officials will demand re-opening of the contracts, claiming that the higher living costs have nullified old agreements.)

Cement prices rose recently, nationwide, following a long strike.

Machinery manufacturers are quoting higher prices on their new equipment.

Prices of new homes continue to creep ahead—a condition resulting both from the higher prices of building materials and also from the higher cost of financing the purchase prices.

**Military Uneasy**—At the Pentagon, the men who let the contracts for the nation's \$19 billion worth of military procurement (annual rate) are getting apprehensive over their shrinking purchasing dollars. They're pointing out that higher prices now mean they've got to ask Congress for more money just to keep procurement activity at the same level.

We're off on another round of inflation, despite all the talk from government, from industry, and from labor leaders about "holding the line." It looks like an across-the-board increase, too. A buyer's strike could slow it down, of course. But as long as the boom continues and customers scramble for goods,

there's no easing of price pressures anywhere in sight.

### Sheet Metal Workers Under Fire

The Senate committee looking into questionable labor-management practices is getting more and more interested in the AFL-CIO Sheet Metal Workers.

Reason for the Senate committee's growing interest in the Sheet Metal Workers Union is the continued refusal of the union to knock off its secondary boycott against the Burt Manufacturing Co., of Akron, O., in the face of clear orders to do so from the AFL-CIO Executive Council.

## \$33.7 Billion Compromise for Defense

**Compromise Figure** — Military programs through next June 30 will be financed by more than \$33.7 billion in new funds. The services also can use some of their \$10.2 billion unobligated from earlier years.

Amount of the new funds is a compromise worked out by conferees from the Senate and House. The final figure is much closer to the \$33.5 billion voted by the House than to the \$34.5 billion the Senate approved. Thus it is considered a product of economy actions both on Capitol Hill and at the Pentagon.

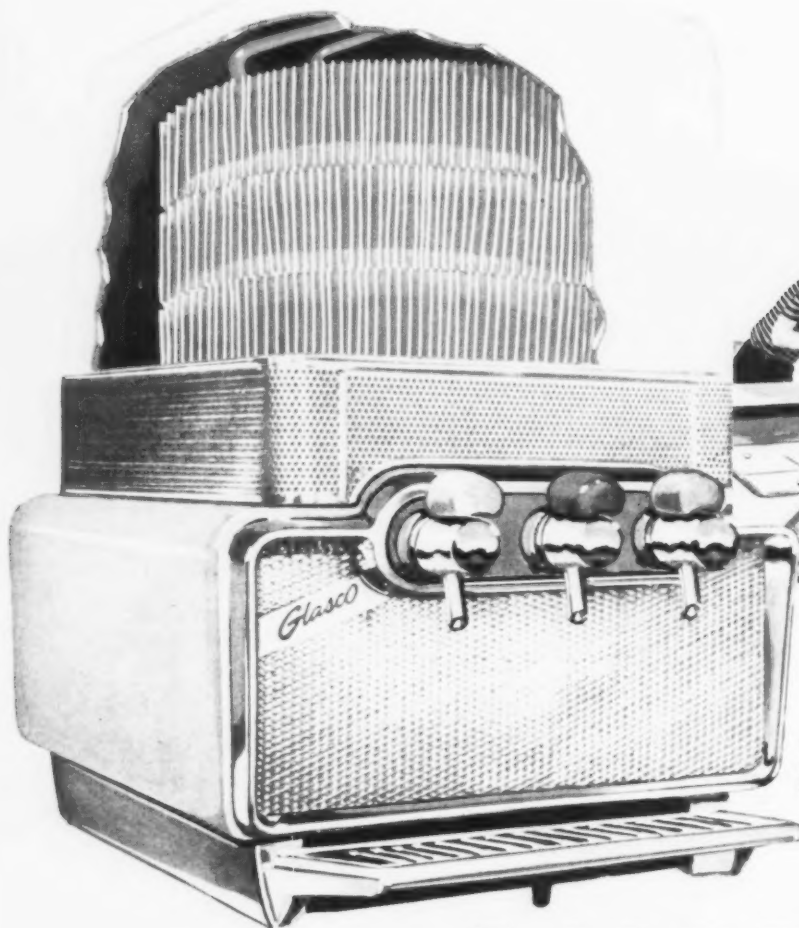
**Plenty to Work With**—It is not, however, an austere budget for the military. The Army put in a bid for \$8.4 billion and got \$7.2 billion. The Navy, with a request for \$10.4 billion, was voted \$9.8

billion. Biggest amount is that for the Air Force, which called for \$16.4 billion and was allowed \$15.9 billion.

Had the Senate's wishes been followed when the final bill was passed, the Air Force would have received more for procurement, operation, and maintenance in its new budget.

**Manpower Cut**—But the Defense Dept. disclosure that 100,000 men would be dropped by the services gave greater weight to the House argument for economy.

Pending approval of the new funds, Defense Secretary Wilson ordered the services to come to him for approval before starting or expanding programs. Existing programs have been kept going at the rate prevailing prior to last June 30.



Glasco pre-mix dispensing machines are manufactured by Glascock Bros. Manufacturing Company, Muncie, Indiana.

## Add COPPER ...and it serves your drink cold!

Your soft drink from a dispensing machine is served *ice cold* because of Copper. For Copper is the *best* heat-transfer material commercially available. *Copper dissipates heat faster.* That's why the coolant-carrying tubes . . . and fins . . . inside the dispenser are Copper.

And that's why Copper is the metal preferred for air-conditioners to keep you cool at home or at work.

Even the big, new liquid-cooled generators are kept cool with Copper.

Copper has other invaluable properties, too. Because it is the best practical conductor of electricity,

wiring and motor-windings are made of Copper. Copper resists corrosion. (It simply won't rust!)

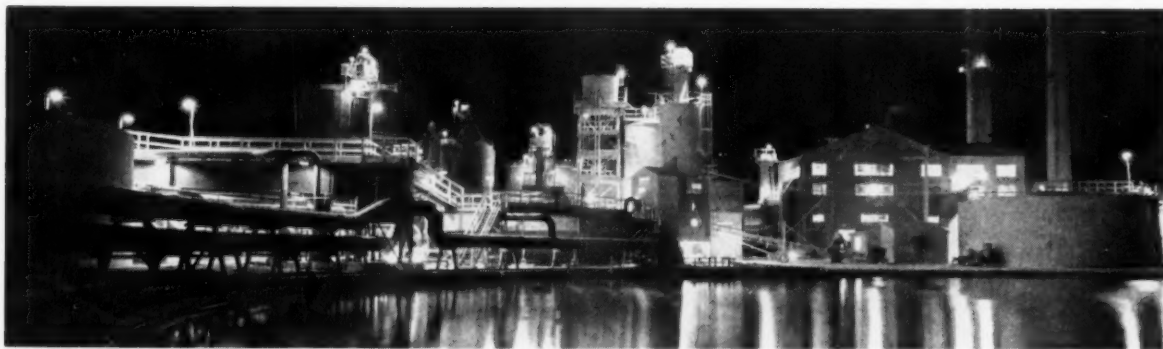
In manufacturing processes, Copper has always been a great metal to *work* with. It proves easy to machine, form, draw, stamp, polish, plate. It welds readily . . . is excellent for soldering and brazing. Besides, you recover a higher portion of your materials cost from the higher-cash-value of your manufacturing scrap!

And today, you can plan with Copper . . . confident that the Copper Industry will keep Copper in ample supply to meet your future needs.

**COPPER • BRASS • BRONZE**  
**in over 40 Standard Alloys!**

For information on cooling or any other application of Copper, write to the Copper & Brass Research Association, 420 Lexington Ave., New York 17, N. Y.





**THICKEN THE MIXTURE:** Primary thickener dominates view of Kaiser Chemicals refractory, Moss Landing.

## How to Get Refractory Orders

■ "I'm optimistic about the refractories market for the balance of 1957. And the next five years look real good, too." That's what Frank M. Cashin says. He's the vice president and general manager of Kaiser Chemicals Div. of Kaiser Aluminum & Chemical Corp., Oakland, Calif.

Cashin is very expansion-minded. He's just completed a \$3 million program that doubled 1955 capacity for making basic brick and ramming mixes. And his division will spend \$8 million more on new plants and expansions within a couple of years.

**Sales Up 20 Pct**—Kaiser Chemical's sales will hit \$15 million this

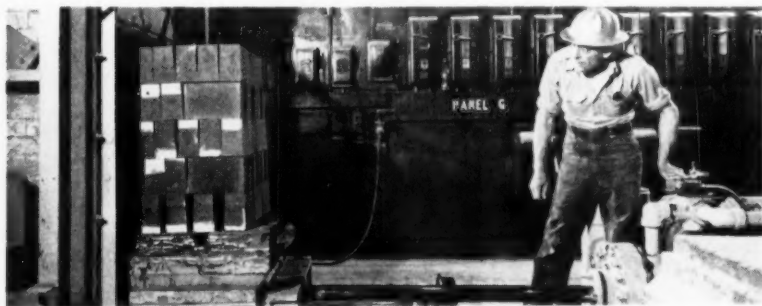
year. That's up a fat 20 pct over 1956. And the division is going all out for a bigger piece of the refractories market. Right now, it sells 25 pct of the country's ramming mix and 13 pct of the basic brick.

But Russ Brennan, the division's general sales manager, says the 47 people in his department are geared for a bigger slice of the basic brick market. Current thinking is in terms of garnering 20 pct of total sales by 1960.

Why so confident? The company is plowing a great deal of money into research. And 15 pct of the program is going into finding the most efficient refractory for oxygen steelmaking furnaces.



**KILN FODDER:** Stockpile of raw dolomite awaits processing and grinding before going to kilns.



**MAN-MADE HEAT WAVE:** Brick gets burning in tunnel kiln at Moss Landing plant so that it will be properly ceramically bonded before delivery to customer. Other brick is sold in unburned or "green" condition.



**REACTION TIME:** Calcined dolomite and seawater join in these reactors to form milk of magnesia.



**THERE'S**



**NO**



**COMPROMISE**

You send print  
to Cone

Cone makes  
recommendations

Cone submits samples  
of your work

You get demonstration  
of your work  
and complete job  
development record

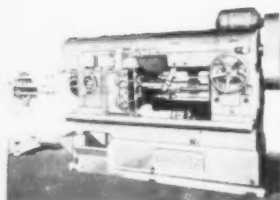
**T**here is no adequate compromise with efficient production practices, if you are in business for a profit.

But you don't always know just how competitively efficient your equipment is. Case histories of what the other fellow is doing are sometimes garbled. At least the poor ones are not advertised. And conditions vary in all plants. Sometimes you have reason to be more concerned with what you don't want in new equipment than with what you do want. Cone believes too much is at stake for a machine to go into a line unequipped for the job, with either carbide or hss tools.

The Conomatic Carbide Development treats each job individually from standpoint of work, machine, tools, and operating personnel.

#### DATA FOR COMPARISON

Part.....Bushing	Length..... $\frac{5}{8}$ "
Machine.....1 $\frac{1}{2}$ " Conomatic	Hole Dia.....1 $\frac{1}{4}$ "
Tools.....100% Carbide Tipped	RPM.....825
Material.....8620	Time.....14.8 Secs.
Stock Size.....1 $\frac{1}{2}$ "	



# Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

For  
particulars  
send for  
"Four Steps With Cone"

# Lease for Cash, or Cut Prices?

## Uniform Rental Plan Raises the Question

**Policy of leasing government-owned tools rent-free under fire.**

**Military says lower prices for end product make up the difference.**

**Legislation may promote rent plan by letting each service keep the cash for tool replacement.—By E. J. Egan, Jr.**

Until a couple of months ago, leasing of government-owned machine tools to defense contractors was as quiet as a mill pond. A variety of quiet agreements had thousands of metalworking machines busy making essential goods.

No rent money, as such, coming in on 225,000 of these tools didn't disturb the still water any. On the contrary, these were considered dandy arrangements.

**Price Cut Instead**—Instead of fussing with rent, the military simply said, "Just cut the price of your end product by so-and-so much and we'll call that your rental fee." Regular cash, lease-payments have been collected on fewer than 18,000 government-owned tools.

In June, Office of Defense Mobilization Director Gordon Gray heaved a big rock into the quiet mill pond. He established a uniform scale of machine tool rental fees for all government agencies (THE IRON AGE, June 27, p. 87). He didn't insist on cash every month, but he did say contractors' price cuts would have to be the full equivalent of a straight cash lease.

**Bargain or Handout**—This question of equivalency is the biggest ripple caused by Gray's directive splash. The military hasn't been

very specific about cut-price agreements. Nobody knows whether it represents a bargain or a virtual handout to contractors.

A federal interagency task group is urging the military to clear up the confusion. It wants proof that full-rent value is being received in no-monthly-payment lease agreements.

**Cash For Replacement**—Ultimately, the task group believes, every lessee should pay a regular cash, rental fee. Toward this end, legislation permitting each government agency to keep its rent collections in a tool-replacement fund is pending in Congress.

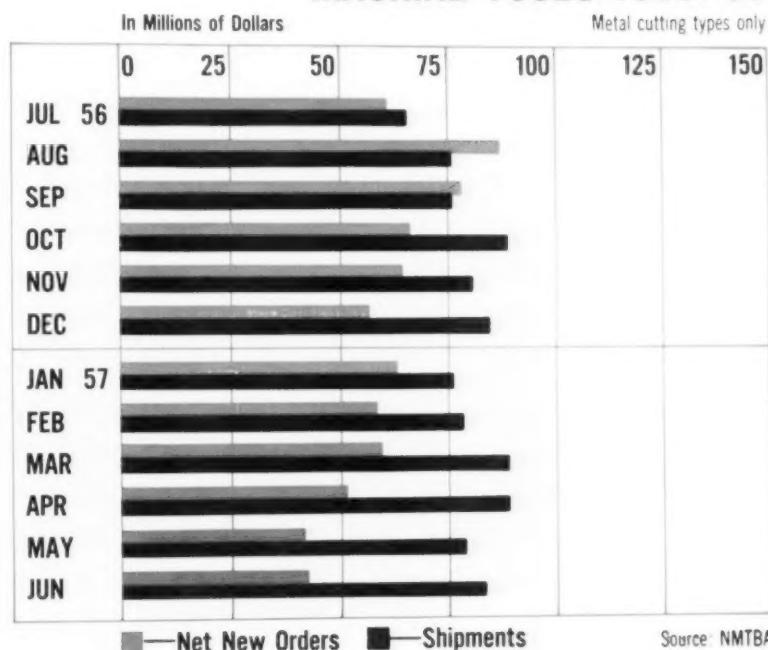
Under the present law, rent must be turned over to the Treasury Dept., and funds for tool replace-

ment must be voted by Congress each year. The bill, S. 2595, will be waiting when lawmakers reconvene in January.

**New Orders Fall Off**—Air Force cancellation of about \$7 million in orders for new machine tools played hob with builders' net new orders in June. Gross sales for metal cutting equipment, in that month, are estimated at \$53.8 million. But the Air Force wallop, plus normal cancellations, cut the net figure to \$42.9 million.

Shipments of metal cutting tools ran to about \$83 million in June, far ahead of new orders. As a result, the industry's backlog at the end of that month was down to 4.2 months' production at current rates.

## MACHINE TOOLS 1956/57



## INDUSTRIAL BRIEFS

**Texas Move**—The National Supply Co. will move its Southwest Div. offices to Dallas, Tex. The move will enable prompt and efficient service to oil field customers. A sales office will be maintained in Fort Worth. The company's new Dallas offices will also become division headquarters for the Field Engineering Dept. of National Supply's Spang-Chalfant Div.

**Acid Test**—Data indicating that the nitric acid content of titanium pickling baths can be modified to accelerate metal removal has been developed by Rem-Cru Titanium Inc., Midland, Pa. The tests, made on all Rem-Cru's standard alloys, show hydrogen absorption is a function of alloy content as well as acid concentration. The data are the result of extensive tests conducted by Dr. H. B. Bomberger, supervisor of fundamental research at Rem-Cru.

**Titanium on Campus** — New York University will conduct its third annual titanium lecture program from Sept. 9-11. Designed for practicing engineers, the program will be held at the NYU College of Engineering. Titanium authorities from industry and research laboratories, together with members of the University's staff, will present 25 lectures.

**Yen's Worth** — Dravo Corp., Pittsburgh, has been awarded a contract by Blaw-Knox Co. for two Dravo-DeLaval mill lubrication systems. They will be installed on a combination merchant bar and rod mill being furnished for Sumitomo Metal Industries, Japan.

**Repair-It-Yourself** — Houghton Laboratories, Inc., Olean, N. Y., is offering an easy-to-use repair kit for tools and castings. Based on epoxy resins, the smooth aluminum colored paste will cure at room temperature and is contained in two flexible tubes.

**Alpine Branch** — Lester B. Knight & Associates, Consulting Engineers, have announced that Knight Engineering Establishment, Vaduz, Liechtenstein, is being formed. To be located in Zurich, Switzerland, the branch office will serve the foundry and allied industries in Europe.

**What Price Spiral?** — General Electric Co. has announced a major price reduction on its complete line of high frequency tetrode transistors. Price cuts ranged from 42 pct to 75 pct. Tetrode transistors are used in radar, television amplifiers, and two-way radio equipment. Transistors can be purchased through authorized GE tube and transistor distributors.

**Bunsen Burners Lighted**—Stauffer Chemical Co. has completed its new petrochemical plant at Louisville, Ky. New facilities are producing chloroform and methylene chloride and quantities of carbon tetrachloride and hydrogen chloride. Construction of the Louisville project began in 1952.

**Ready Mix**—Alumatone Corp., has developed a ready mix aluminum paint. It air dries in about three minutes with minimum smudging and has been developed for assembly lines.



"Gesundheit!"

**Wizardry at Menlo Park**—Stanford Research Institute is establishing a Naval Warfare Research Center. Purpose is for long-range studies covering a broad area of the Navy's research and development program. The center will be located at the principal laboratories of the Institute in Menlo Park, Calif. There will be a unit maintained in Washington, D. C., for research and liaison purposes.

**Dust Removal**—Hagan Chemicals & Controls, Inc., Pittsburgh, is now manufacturing a centrifugal dust collector. The company claims it has the highest efficiency and lowest erosion rate of any mechanical dust collector on the market. The collector has marked success in elimination of fly ash from coal-fired steam boilers in steel mill power plants. Collection efficiencies range as high as 97 pct in some installations.

**Kilowatt Record**—According to the American Iron and Steel Institute, the iron and steel industry used a record amount of electric power last year. The total was 35,833 million kw hrs of electric power, or about 3 pct more than in 1955. The industry generated nearly one-third of the power it used and purchased the remainder.

**Rubber Agreement**—The Goodyear Tire & Rubber Co. will establish and develop a rubber plantation in Guatemala. It will be organized under the laws of Guatemala as a Guatemalan company, Goodyear Rubber Plantations, Inc. The new subsidiary corporation has acquired 3,400 acres of land in the southwest section of the country to be used for the planting of high-yield disease-resistant hevea trees.

**North Atlantic Pact**—Atlas Steels Ltd., Welland, Ont. has completed a working agreement with Usines Gilson, S. A. Atlas acquires about 30 pct ownership of the Belgian firm, headquartered in La Croyere, Belgium. This plant expects to expand its manufacture of specialty steels to include Atlas brands and qualities in the near future.



# 3 dependable products for the diesel industry

## DE LAVAL IMO PUMPS

De Laval IMO pumps do a dependable job during long years of service. The reason is IMO design simplicity. De Laval IMO's have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no reciprocating parts to wear or become noisy. Quiet, compact IMO pumps are excellent for direct-connected, high-speed operation. They can be furnished in capacities to 1,000 gpm and pressures to 1,500 psig.

## DE LAVAL HYDRAULIC FAN DRIVES

De Laval Hydraulic Fan Drives for air cooled heat exchangers and cooling towers offer these important advantages. They *save* power since the fan operates at full speed only a portion of the time. They provide *accurate, automatic* control of engine jacket water temperature, and also assure complete operational flexibility. These units stay on the job for years. As shown, both IMO motor and speed reducer are mounted and factory aligned on a single bedplate.

## DE LAVAL HIGH PRESSURE TURBOCHARGERS

De Laval turbochargers offer pressure ratios of 3:1 as well as higher compressor and turbine efficiencies than those found in conventional turbocharger systems. Output of heavy duty diesel, gas and dual-fuel engines may be doubled by De Laval turbochargers without increasing thermal loading. Exclusive Monorotor design offers a compact lightweight unit of sturdy construction. De Laval turbochargers are self-adjusting to engine loads, can be used on 4- and 2-cycle engines.



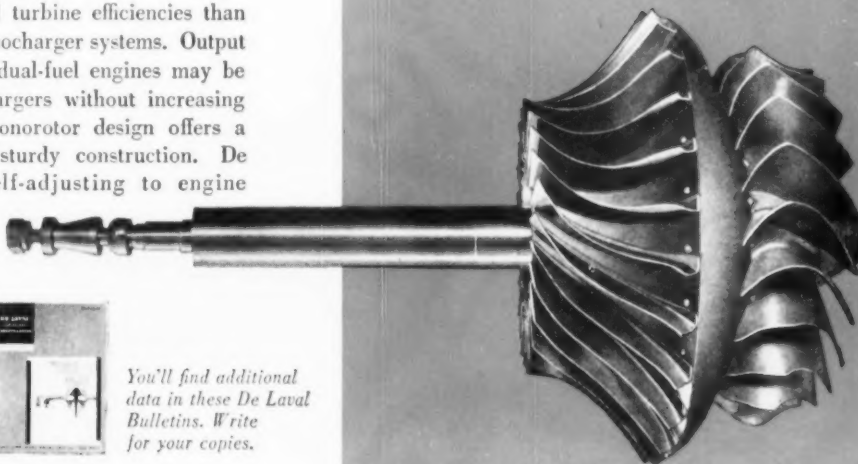
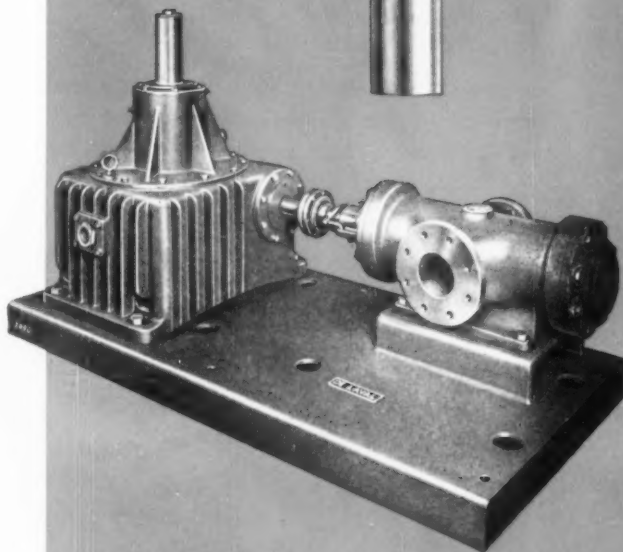
You'll find additional data in these De Laval Bulletins. Write for your copies.



**DE LAVAL**

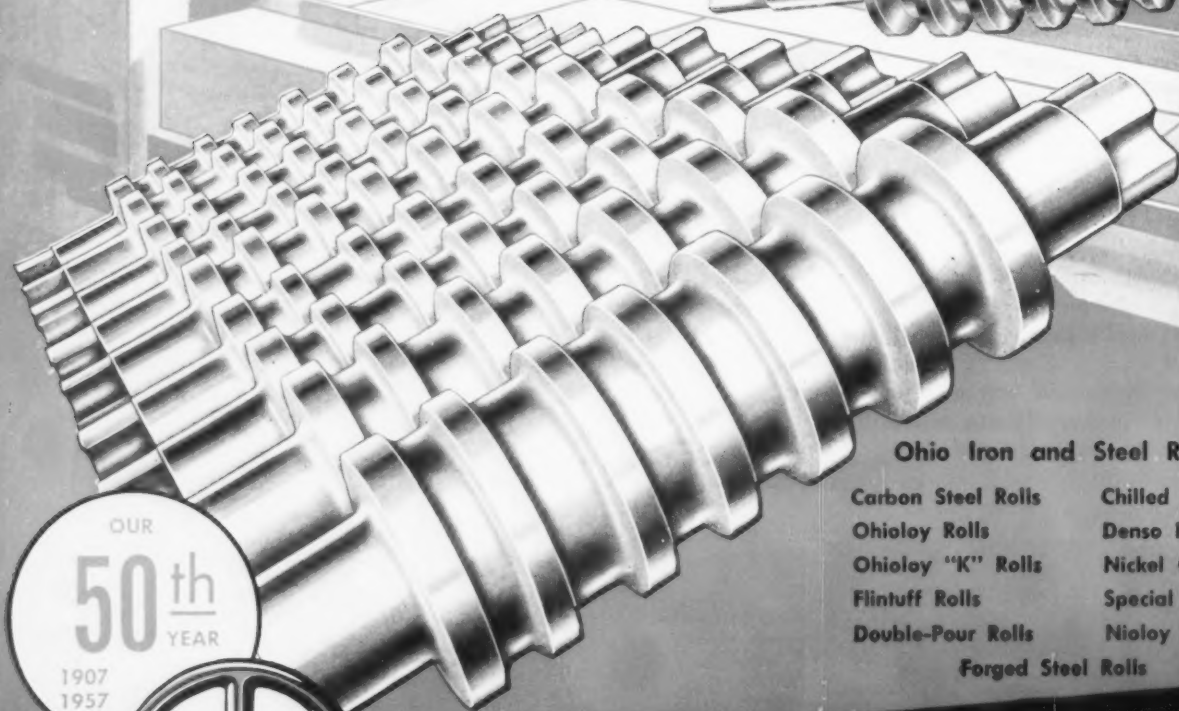
*Steam Turbine Company*

TRENTON 2, NEW JERSEY



# Ohio Rolls

shaping metal for all industry



OUR  
**50<sup>th</sup>**  
YEAR

1907  
1957



## Ohio Iron and Steel Rolls:

Carbon Steel Rolls	Chilled Iron Rolls
Ohioloy Rolls	Denso Iron Rolls
Ohioloy "K" Rolls	Nickel Grain Rolls
Flintuff Rolls	Special Iron Rolls
Double-Pour Rolls	Nioly Rolls
Forged Steel Rolls	

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO

Plants at Lima and Springfield, Ohio

**A. G. Forrest**, named asst. to chief metallurgist, Cleveland general offices Republic Steel Corp.

**E. L. Simanek**, appointed district manager, St. Louis warehouse, U. S. Steel Supply Div., U. S. Steel Corp.

**H. E. Stahl**, appointed sales manager, Rochester Products Div., General Motors Corp.



**Sam Gurley, Jr.**, appointed vice president, sales, Olin Aluminum, Olin Mathieson Chemical Corp.



**I. K. MacGregor**, elected vice president, Eastern operations, Climax Molybdenum Co., New York.

**Tom Conway**, appointed director, manufacturing services, Borg-Warner Corp., Chicago.

**L. B. Lindemuth, Jr.**, appointed openhearth superintendent, Keystone Steel & Wire Co.; **A. R. Edwards**, will become administrative and technical advisor.



**John Milos**, elected vice president and director, Phoenix Bridge Co.

**Dr. Sheldon Weinig**, appointed president, Materials Research Corp.

**L. R. Ripley**, elected president, Waltham Precision Instrument Co.

**H. M. Miller**, named senior vice president, Wheelabrator Corp., Mishawaka, Ind.; **J. A. Schmidt, Jr.**, named secretary-treasurer; **J. M. Wolf**, appointed controller; **E. T. Sullivan**, appointed asst. secretary and asst. treasurer.

**S. S. Krentel**, named executive vice president, MacDermid, Inc.



**D. W. Cameron**, appointed vice president, manufacturing, Montreal Locomotive Works, Ltd., Canadian affiliate of Alco Products, Inc.

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**Mort Werner**, elected vice president, Kaiser Industries Corp.

**H. R. Black**, appointed treasurer, U. S. Steel Homes Div., U. S. Steel Corp.

**L. T. Letsinger**, will become works manager, Davenport, (Iowa) fabricating operations, Aluminum Co. of America; **S. H. Bennett**, named asst. works manager; **E. B. Fassel**, will become special asst. to general manager, Fabricating Div.

**R. S. Abrams**, appointed general manager, and **L. J. Sinnott**, appointed general sales manager, Silicones Div., Union Carbide Corp.



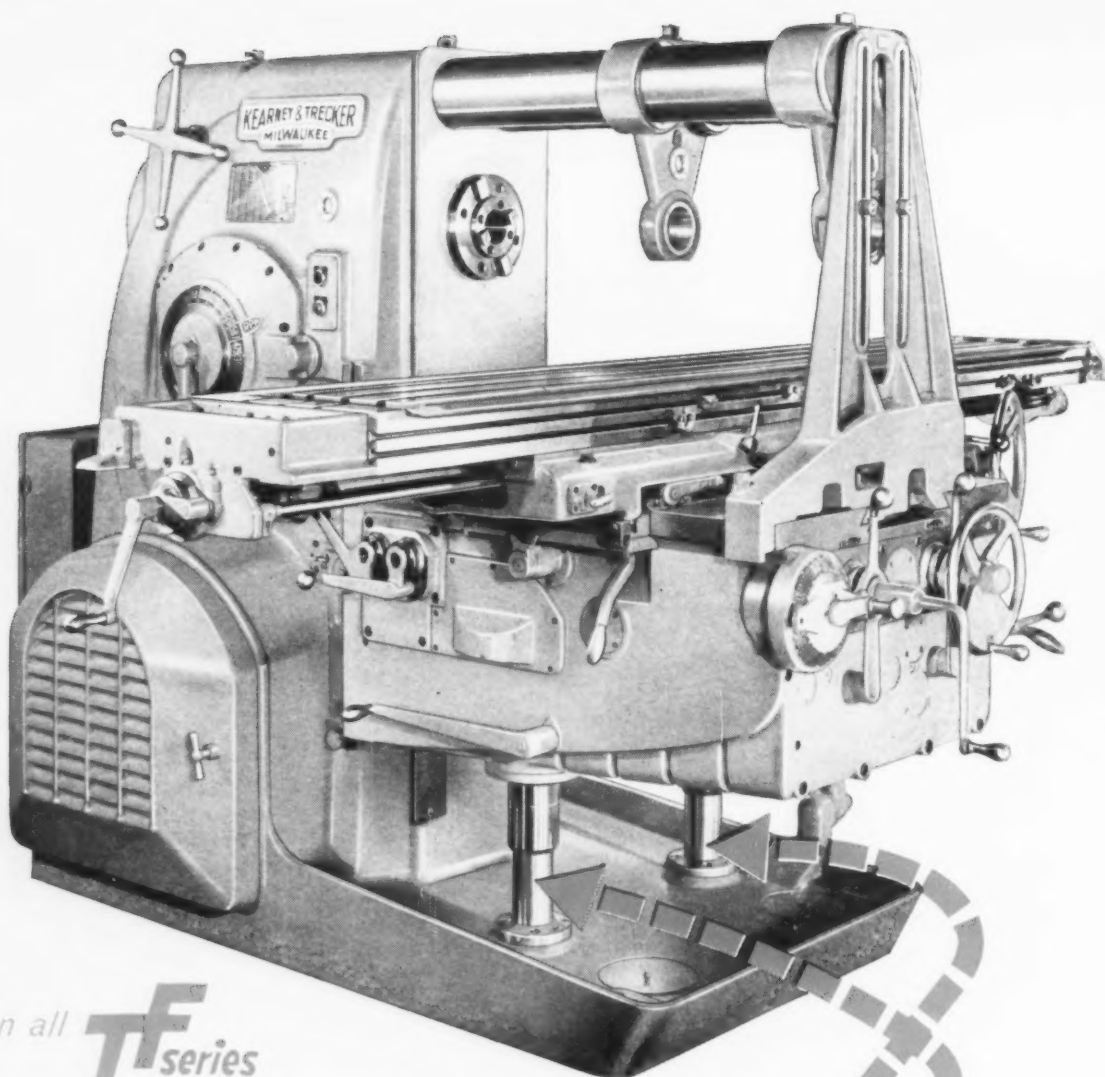
**R. L. Reed**, appointed regional manager, Pittsburgh sales region, Electro Metallurgical Co.

**H. P. Lockhart**, appointed asst. general manager, Austin-Western, Construction Equipment Div., Baldwin-Lima-Hamilton Corp.

**D. A. Hayes**, appointed chief metallurgist, U. S. Steel Corp.'s Gary Steel Works.

**H. A. Collins**, named production coordinator, fabricated products operations, Blaw-Knox Co.

**F. E. Davison**, named asst. to vice president, Steam Div., West-



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inghouse Electric Corp., Lester, Pa.; **H. T. Duff**, appointed budget administrator.

**M. P. Sirko**, appointed Eastern regional sales manager, Norden-Ketay Corp.

**W. A. Sneed**, appointed general sales manager, Permatex Co., Inc.

**Lowell Jensen**, appointed works manager, Famco Machine Co., Kenosha, Wis.



**S. R. Kuhns**, named asst. works manager, Cleveland operations, Aluminum Co. of America.

**G. E. Beggs**, appointed asst. to president, in charge of long-range planning, Leeds & Northrup Co., Philadelphia.

**W. O. Schwartz**, named sales manager, St. Louis steel service plant, Joseph T. Ryerson & Son, Inc.

**G. A. Pyle**, appointed asst. manager, stainless steel products sales, American Steel & Wire Div., U. S. Steel Corp.

**R. W. Lang**, appointed manager, Director Systems Dept., Westinghouse Electric Corp.

**J. W. Slattery**, appointed general supervisor, stainless steel field sales, Crucible Steel Co. of America, Pittsburgh.

**L. C. Lindstrom**, appointed sales manager, Air Impeller Div., The Torrington Mfg. Co., Torrington, Conn.



**O. H. Yoxsimer**, appointed manager, E. Springfield appliance plant, Westinghouse Electric Corp.

**D. R. Beggs**, appointed general superintendent, Reading plant, The Carpenter Steel Co.; **F. W. Evans**, will become production manager.

**B. J. Coler**, named asst. sales manager, Rolled Steel Corp., Skokie, Ill.

**R. H. Robinson**, appointed sales engineer and manager, Buffalo district office, General Alloys Co., Boston.

**B. K. Hattery**, appointed credit office manager, Seattle plant, Joseph T. Ryerson & Son, Inc.

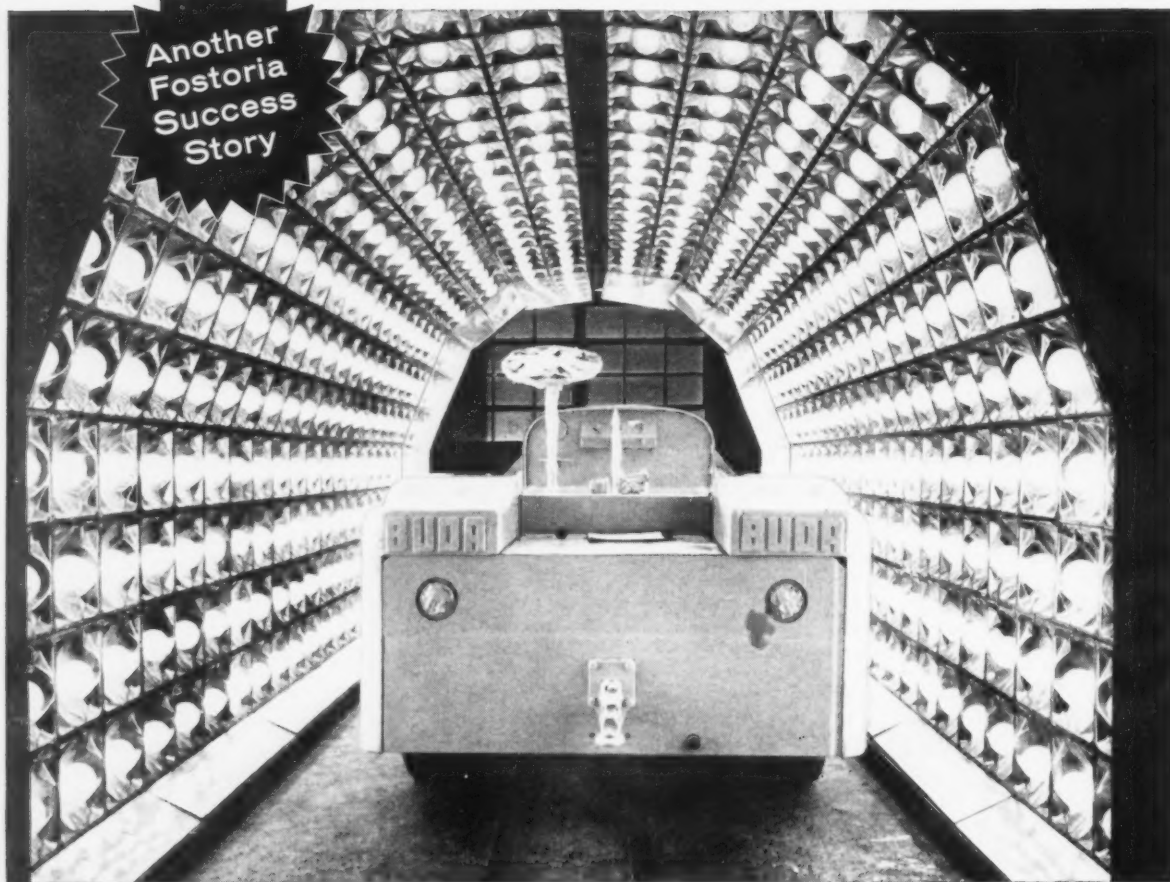


**W. J. Borwick**, appointed asst. vice president, commercial, U. S. Steel Supply Div., U. S. Steel Corp.

**H. L. Powell**, promoted to asst. to vice president, Goodyear Tire & Rubber Co., Akron, O.; **R. F. Tomkinson**, named manager, Manufac-



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turers Sales Dept., Akron; **C. H. Bruns**, named manager, Milwaukee office; **C. A. Bethel, Jr.**, named account executive, Detroit office; **F. L. Hall**, named account executive, Milwaukee office.



**R. V. Little, Jr.**, named manager, Product Engineering Dept., Brush Electronics Co., Cleveland.

**D. H. Voelker**, appointed special sales engineer, Industrial Hydraulics Div., Parker Appliance Co.

**R. J. Brillhart**, promoted to cost controller and **W. P. Hellwig**, named asst. purchasing agent, Columbus Bolt & Forging Co., Columbus, O.

**J. D. Knox**, appointed head, project engineering, Adamas Carbide Corp., Kenilworth, N. J.

**R. E. Wallace**, named San Francisco district manager, Triangle Conduit & Cable Co., Inc.

**W. J. Campbell**, named consultant, management training, General Electric Co.'s Advanced Management School, Crotonville, N. Y.

**R. L. Hoeck**, appointed New York district sales manager, Magnethermic Corp., Youngstown, O.

**Dr. W. H. Brandt**, named director, advanced systems engineering, Sunnyside Mfg. Div., Westinghouse Electric Corp.

**T. C. Ohart**, named general manager, insulating materials section, Chemical Materials Dept., General Electric Co.

**C. E. Claus**, appointed plant manager, Grand Rapids plant, Doehler-Jarvis Div., National Lead Co., Toledo.



**J. W. Watson**, named general sales manager, Kaiser Aluminum & Chemical Corp., Chicago.

**Sid Mitwol**, promoted to manager, Detroit office, Sel-Rex Corp., Nutley, N. J.

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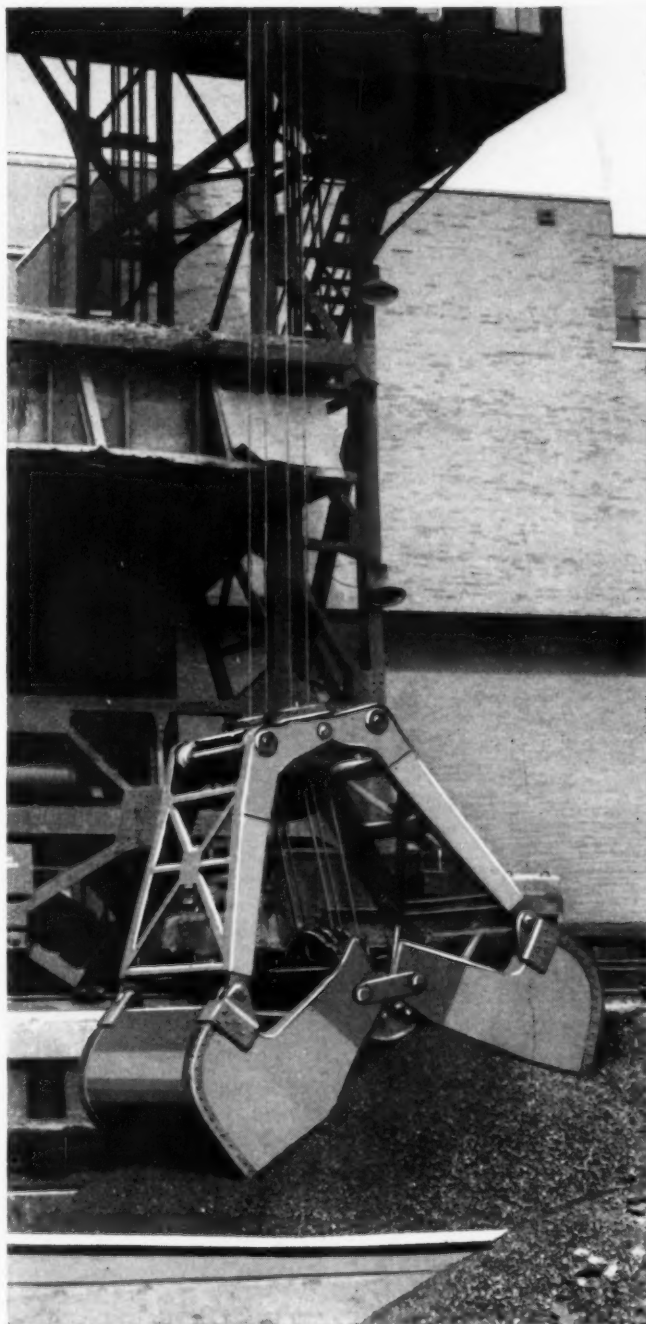
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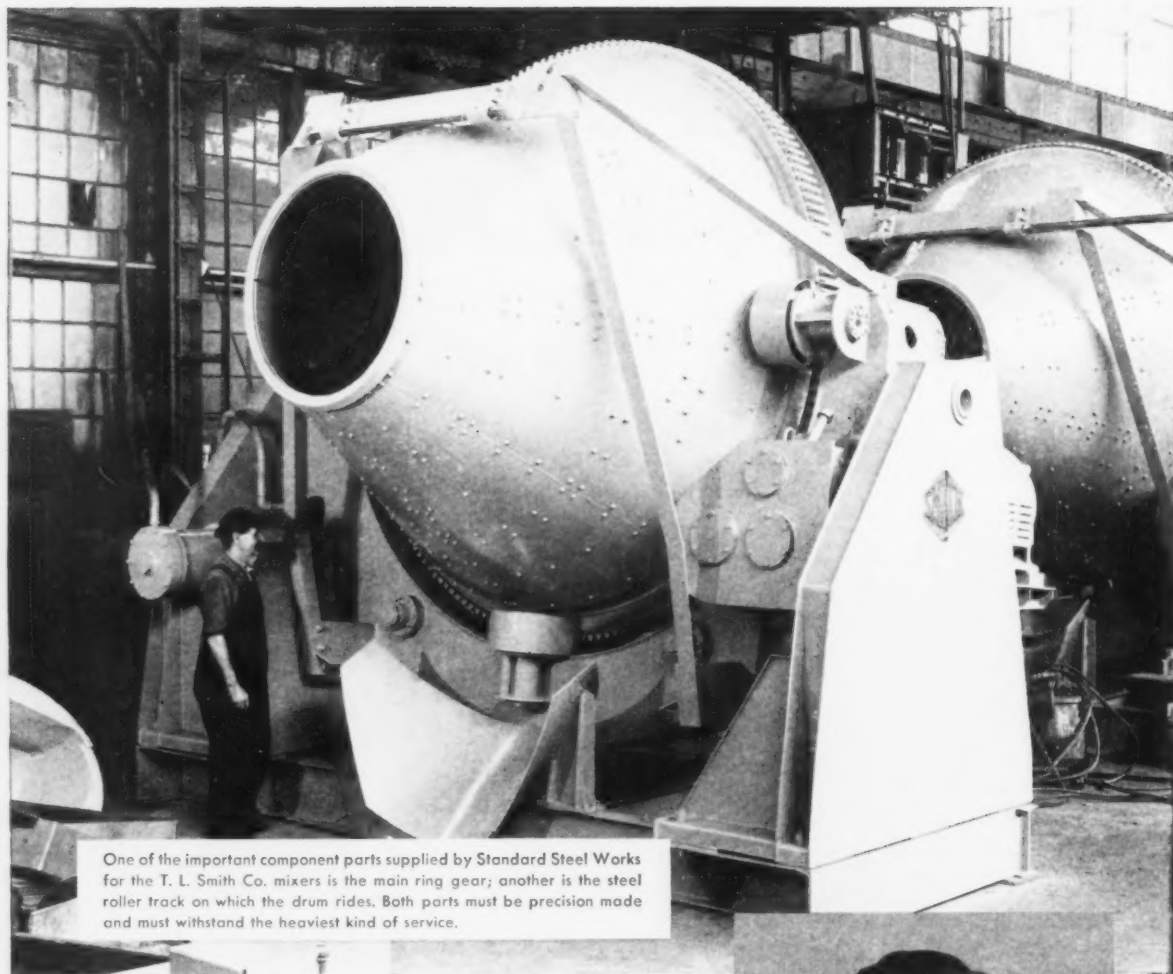
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**M. H. Luttrell**, named general sales manager, Walworth Co.

**L. A. Michaelsen**, appointed sales manager, Beaver Tool & Engineering Corp., Royal Oak, Mich.

**H. L. Planche**, appointed division tubular manager, Canadian Div., The National Supply Co., Calgary, Alberta.

**J. B. Cameron**, appointed industrial defense coordinator, Jones & Laughlin Steel Corp.



**J. E. Menz**, appointed general manager, Industrial Div., Kaiser Aluminum & Chemical Corp.

**E. E. Nicholas**, named manager, sales engineering, Special Products Div., The Colson Corp.

**C. O. Larson**, appointed superintendent, Machine Div., Moore Special Tool Co., Inc., Bridgeport, Conn.

**D. A. Hough**, appointed sales manager, The Block Steel Corp., Forest Park, Ill.

**M. S. Dayton**, appointed marketing manager, Berkeley Div., Beckman Instruments, Inc.

**A. W. Blecker**, named asst. sales manager, Lebanon Steel Foundry.

**D. W. Oakley**, named production manager, Metal & Thermit Corp., New York; **H. A. Rack**, appointed manager, engineering; **C. H. Carpenter, Jr.**, appointed technical advisor to the president; **K. E. Doud**, named asst. manager, engineering.

**R. L. Scott**, appointed manager, mining supply sales, The Colorado Fuel & Iron Corp., Denver, Colo.; **H. K. Schmuck, Jr.**, appointed asst. manager, mining supply sales.

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# Higher Vanadium Improves Hot Strength Of Low Alloy Steel

By Paul Shahinian—Metallurgist, Naval Research Laboratory, and J. R. Lane\*—Staff Metallurgist, Materials Advisory Board of the National Academy of Sciences, Washington, D. C.

**Molybdenum is a "must" in low alloy, high temperature steels. But can some of this molybdenum be replaced by a higher vanadium content?**

**This highly informative article spells out both the advantages and limitations.**

Higher vanadium contents can be substituted for molybdenum in low alloy steels for high temperature service. To some extent, the higher vanadium actually results in a better high-temperature alloy. But to get this improvement, it is necessary to use higher normalizing temperatures.

These are some of the highlights

\* Mr. Lane was formerly with the Naval Research Laboratory.

of a recent test program conducted by the U. S. Naval Research Laboratory, Washington, D. C. The results of the program should prove to be of considerable value to the ever-growing number of users of high-temperature materials.

**Base Composition**—At the outset of the program, it was necessary to choose a base composition that was reasonably similar to compositions currently in use. With this in mind, a base composition of 0.20 pct carbon, 0.20 pct silicon, and 0.50 pct manganese was chosen. To this base composition, additions of molybdenum, vanadium, and chromium were made in seven experimental heats.

The heats were melted in a small induction furnace and cast into 70-lb ingots. The same deoxidation

practice was used for all heats. Aluminum (one pound per ton) was added to the ladle in addition to the use of ferrosilicon. Sections of the ingots were forged at 2150°F into 5/8-in. square bars.

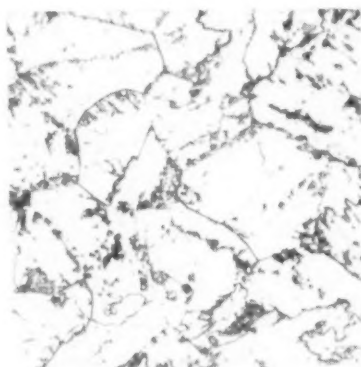
**Normalized And Tempered** — Creep-rupture properties of the various wrought modifications were

**TABLE I**  
Chemical Compositions of the Steels

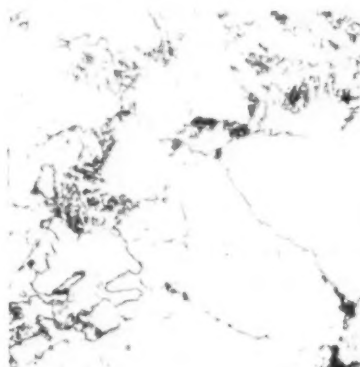
Heat	Chemical Composition (%)					
	C	Si	Mn	Mo	V	Cr
A	0.22	0.19	0.42	0.54	-	-
B	0.20	0.22	0.61	0.50	0.21	-
C	0.17	0.19	0.46	0.30	0.18	-
D	0.20	0.25	0.53	-	0.20	-
E	0.23	0.34	0.60	0.29	0.48	-
F	0.20	0.22	0.55	0.27	0.72	0.59
G	0.18	0.21	0.48	0.46	0.66	0.56



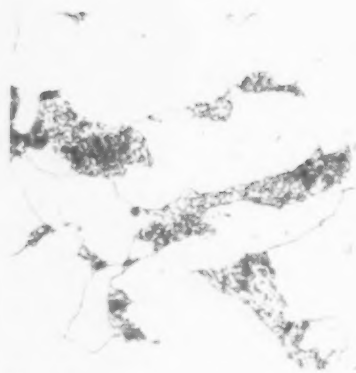
**Heat A:** Contains 0.5 pct Mo, with a grain size of ASTM 5. Normalized at 1950°F. Mag.: 500X



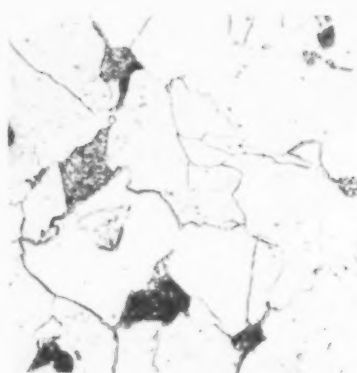
**Heat B:** Contains 0.5 pct Mo, 0.2 pct V, with grain size of ASTM 6. Normalized at 1950°F. Mag.: 500X



**Heat C:** Contains 0.3 pct Mo, 0.2 pct V, with grain size of ASTM 6. Normalized at 1950°F. Mag.: 500X



**Heat D:** Contains 0.2 pct V, with a grain size of ASTM 6; Normalized at 1950° F. Mag.: 500X



**Heat E:** Contains 0.3 pct Mo, 0.5 pct V, with grain size of ASTM 6; Normalized at 1950° F. Mag.: 500X

evaluated in four different heat-treated conditions. These were: 1) normalized at 1800° F for 1 hour, 2) normalized at 1800° F for 1 hour and tempered at 1250° F for 6 hours, 3) normalized at 1950° F for 1 hour and tempered at 1250° F for 6 hours, and 4) normalized at 2000° F for 3 hours and tempered at 1250° F for 6 hours.

The materials were cooled at a

retarded rate from the austenitizing temperature. The cooling rate was about the same as that which occurs in the center of a 4-in. round bar cooled in air.

Creep-rupture tests were run at 900° and 1100° F. Specimens were of 0.250-in. diam. with a gage length of 1.25 in. Test procedures conformed with ASTM recommended practice.

**TABLE II**  
Room-Temperature Tensile Properties

Heat Treatment	Heat*	Tensile Strength (psi)	0.2% Yield Strength (psi)	Elongation (%)	Reduction of Area (%)
Normalized at 1800° F and tempered at 1250° F	A	69,000	46,000	38	63
	B	115,500	101,000	21	65
	C	110,000	94,000	23	62
	D	68,000	54,000	41	73
	E	84,000	67,000	30	73
	F	72,000	39,000	37	83
	G	71,500	35,000	39	81
Normalized at 1950° F and tempered at 1250° F	A	69,500	47,000	33	64
	*B	117,000	102,000	22	62
	C	101,000	77,500	23	60
	D	70,000	48,000	33	70
	E	104,000	73,000	25	64
	F	96,000	64,500	25	75
	G	84,500	51,000	31	74

\*Heat A - 0.5% Mo

B - 0.5% Mo, 0.2% V

C - 0.3% Mo, 0.2% V

D - 0.2% V

E - 0.3% Mo, 0.5% V

F - 0.3% Mo, 0.7% V, 0.6% Cr

G - 0.5% Mo, 0.7% V, 0.6% Cr

**Variety Of Tests**—In addition, room-temperature tensile tests were made of the steels after normalizing from both 1800° and 1950° F and tempering.

The creep-rupture tests were conducted for durations of up to several thousand hours. They produced data on rupture life, minimum creep rate, elongation at fracture, and reduction of area.

Since the superiority in strength of one alloy over another depended upon the stress level as well as temperature, it was necessary to select a common basis for the evaluation. The criteria used to judge the relative merits of the alloys were the 1000-hour rupture strength and the stress to produce a minimum creep rate of 0.001 pct per hour.

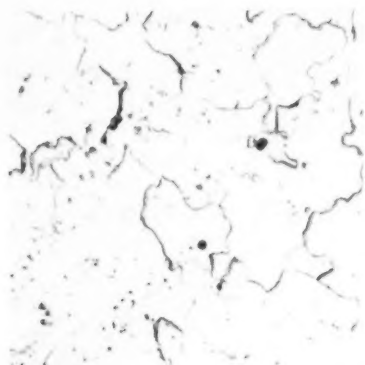
**About Equivalent**—Room-temperature tensile properties of the steels (Table 2) show that the strongest heats are B (0.5 pct Mo, 0.2 pct V) and C (0.3 pct Mo, 0.2 pct V), two of the lower alloyed steels. The 0.2 pct vanadium heat (D) had about the same properties as the 0.5 pct molybdenum heat (A).

Normalizing at 1950° F, rather than 1800° F, markedly improved the strength of the steels with a high vanadium content. Heats A, B, and D were not affected by the higher temperature treatment. Heat C was actually reduced in strength. Heat E (0.3 pct Mo, 0.5 pct V) showed the same strength level as Heat C.

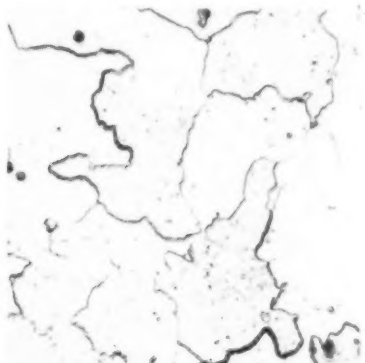
**Lower Ductility** — Higher temperature normalizing reduced the ductility of the steels as indicated by the total elongation. Only the high-vanadium heats showed the corresponding drop in the reduction of area.

In general, high strength was accompanied by low ductility. As a rule, this drop in ductility was not enough to render the steels unsuitable for many engineering applications.

Changes in rupture life and minimum creep rate with stress of the steels normalized at 1800° F and



**Heat F:** Contains 0.6 pct Cr, 0.3 pct Mo, 0.7 pct V, ASTM 6-7. Normalized at 1950°F. Mag.: 500X



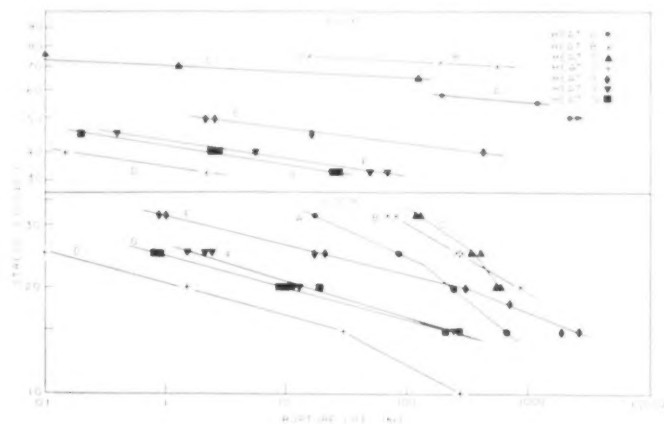
**Heat G:** Contains 0.6 pct Cr, 0.5 pct Mo, 0.7 pct V, ASTM 6-7. Normalized at 1950°F. Mag.: 500X

tempered are shown in Figs. 1 and 2. Curves for the steels normalized at 1800°F and not tempered are shown in Figs. 3 and 4.

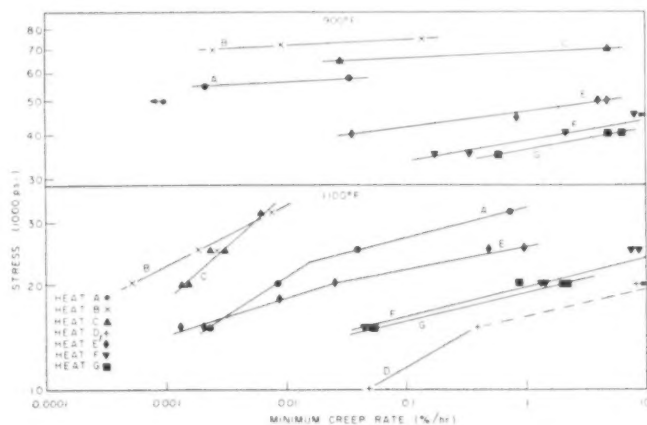
**Hot Strength**—In the normalized (1800°F) and tempered condition, the strongest steel at 900°F was Heat B (0.5 pct Mo, 0.2 pct V). Next in strength were Heat C (0.3 pct Mo, 0.2 pct V) and the vanadium-free heat (A). The heats with the larger vanadium additions (E, F, and G) were relatively weak. Weakest of all was the molybdenum-free heat (D).

At 1100°F the order of strengths was generally the same as that at 900°F. The exception was Heat E which was about as strong as Heat C. For very long times, beyond 1000 hours, the curves in Figs. 1 and 2 indicate that Heat E should be superior to Heat C.

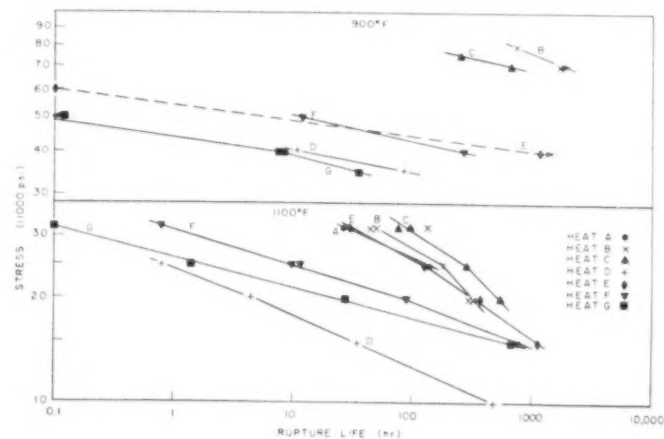
The strongest steels (B and C)



**Fig. 1:** Rupture strengths of steels normalized at 1800°F, tempered.



**Fig. 2:** Creep strengths of steels normalized at 1800°F, tempered.



**Fig. 3:** Rupture strengths of steels normalized at 1800°F.

possessed poor ductility, particularly at 1100°F. Many of the test specimens fractured in the fillets.

**Some Improvement** — Normalizing at 1800°F without the temper produced slightly higher strengths for the steels at 900°F (Figs. 3 and 4). At 1100°F, there was no significant increase in strength as a result of this heat treatment. With the exception of Heat C — the strongest alloy at 1100°F — the order of strength of the untempered steels was generally the same. Lack of tempering did not significantly affect ductility.

The relatively poor properties of

the high-vanadium compositions indicated the possible need for a higher solution temperature. The alloys given a normalizing treatment from 1950°F and tempered displayed the variation of rupture life and creep rate with stress shown in Figs. 5 and 6. Normalizing from 1950°F markedly strengthened the steels with a high content of vanadium (Heats E, F, and G).

The remainder of the steels were not appreciably affected. At 1100°F, Heat B was weakened slightly. The higher normalizing temperature did not change the order of strength of the alloys at 900°F.

But at 1100°F, the strongest alloy was Heat F (0.3 pct Mo, 0.7 pct V, 0.6 pct Cr). This alloy was followed in order of decreasing strength by Heats E, G, C, A, and B. Ductility was reduced by the higher normalizing temperature, particularly for the high-vanadium heats. Yet, the elongation-at-fracture values of these steels were higher than those of Heats A, B, and C at 1100°F.

**Better Creep And Rupture** — Increasing the normalizing temperature to 2000°F improved the rupture and creep strengths of the alloys at 1100°F. This is particularly true of the high-vanadium heats. Heat D was an exception. According to the test data in Figs. 7 and 8, the strongest heats were F and G (Cr-Mo-V), followed closely by Heat E (Mo-V).

Compared with the steels austenitized at 1950°F, there was no change in strength at 900°F except for a small increase by Heats D and G. Ductility of the high-vanadium heats was reduced by the rise in normalizing temperature.

**Effective Combination** — The results of the study show that the addition of 0.2 pct vanadium to a 0.5 pct molybdenum heat generally raises strength. A similar heat containing 0.2 pct vanadium but with less molybdenum (0.3 pct) when normalized at the higher temperatures, 1950° and 2000°F, possessed slightly better properties at 1100°F.

This steel (C) was also stronger than the 0.5 pct molybdenum steel. An increase in vanadium content to 0.7 pct (Heat E) further raised the strength at 1100°F.

**Saves Molybdenum** — In the case of the chromium-molybdenum-vanadium steel, no improvement in strength is achieved by the addition of 0.5 pct molybdenum compared to 0.3 pct. In fact, sometimes a weakening results.

A possible saving in molybdenum is indicated in these compositions. It was apparent, however, that the

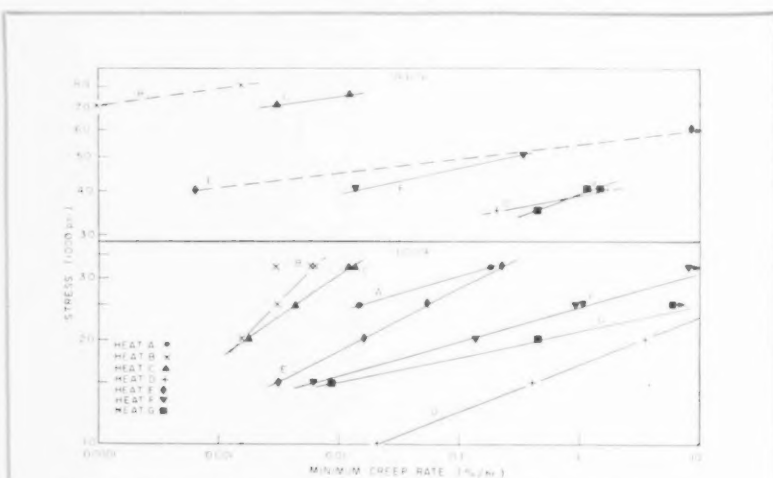


Fig. 4: Creep strengths of steels normalized at 1800°F.

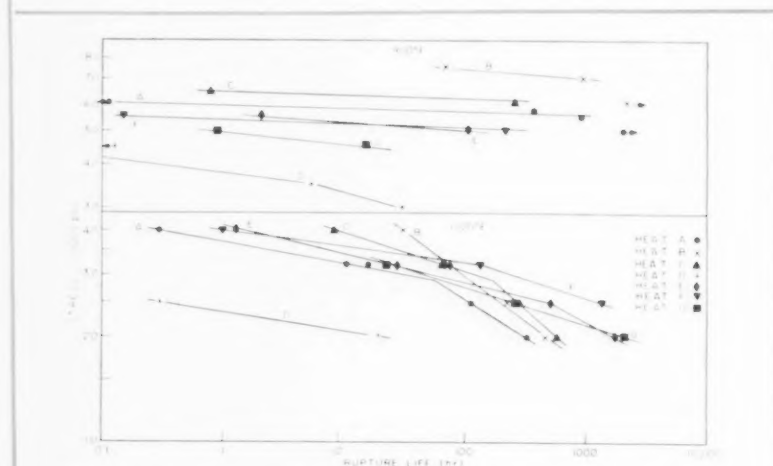


Fig. 5: Rupture strengths of steels normalized at 1950°F, tempered.



presence of molybdenum is necessary for high-temperature strength. The higher strengths of Heats F and G may be partially attributed to the chromium. This element, in amounts up to 1 pct, is known to raise strength.

Benefit from the high-vanadium (and chromium) additions was realized only with normalizing temperatures of 1950° or 2000°F. Actually, a reduction in strength occurred when the normalizing temperature was 1800°F.

**Grains Coarsen** — The increase in strength in these steels as the austenitizing temperature is raised is probably due to a greater solution of carbides and to grain coarsening. Both phenomena can be seen in the resulting microstructures.

The properties of the steels determined in this study are probably not the optimum. Nor will the relative order of strengths necessarily remain the same out to very long times. In fact, the slopes of the log stress versus log rupture life curves indicate that in several cases changes in relative strength level will occur.

It should also be recognized that other tempering temperatures and times may alter the superiority of one alloy over another in addition to affecting the individual strength levels.

**Future Potential**—Still, it was shown that for service at 1100°F and possibly at lower temperatures and longer times, the standard molybdenum - vanadium compositions may be replaced by compositions containing less molybdenum and more vanadium. No strength is lost, provided a higher austenitizing temperature is used. In most cases, a substantial strengthening was attained.

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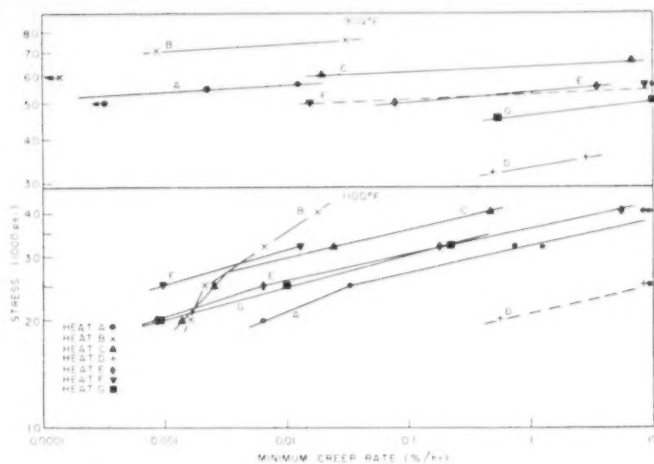


Fig. 6: Creep strengths of steels normalized at 1950°F, tempered.

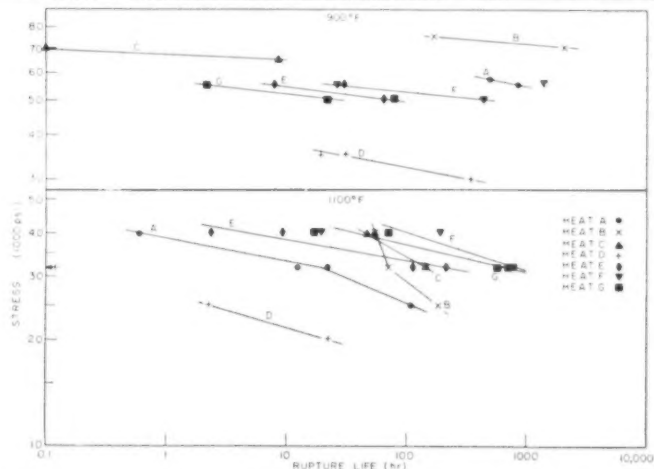


Fig. 7: Rupture strengths of steels normalized at 2000°F, tempered.

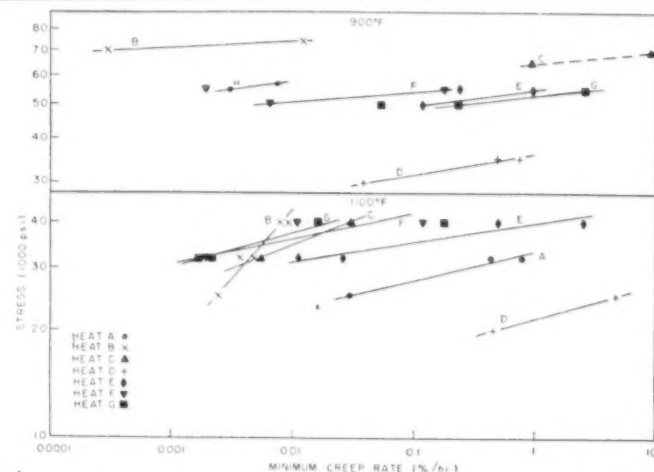


Fig. 8: Creep strengths of steels normalized at 2000°F, tempered.

# High Output and Flexibility Can Go Together

**The more you conveyorize and mechanize, the more benefits you reap in quality and output.**

**But, there is a danger in becoming too inflexible to take care of the many styles of a product.**

**One company overcomes that problem with good product design and plant layout.**

■ Several years ago when it became apparent that small motors were increasingly in demand for the fan and air-conditioning industry, Westinghouse Electric Corp. decided to enter the field.

None of its existing plants were set up to produce such motors. Basically it was a matter of designing a complete line of motors for a specialized field. But more than

that, it required setting up plants to keep up with new techniques.

The newest of four fractional horsepower motor plants is now in operation at Upper Sandusky, O. The new one-story 66,000 sq ft plant is flexible enough to permit manufacture of two different motors: shaded-pole and permanent-split capacitor types in about 30 different styles and sizes.

**Fresh Design** — One need had been continually emphasized by potential users: The motor must have a five-year guarantee to operate with other components in air-conditioning units which have the standard five-year guarantee.

With this need as a basic requirement, the design engineers developed a motor with a new bearing and lubrication system. The self-aligning bearings incorporate a steel-backed babbitt bearing

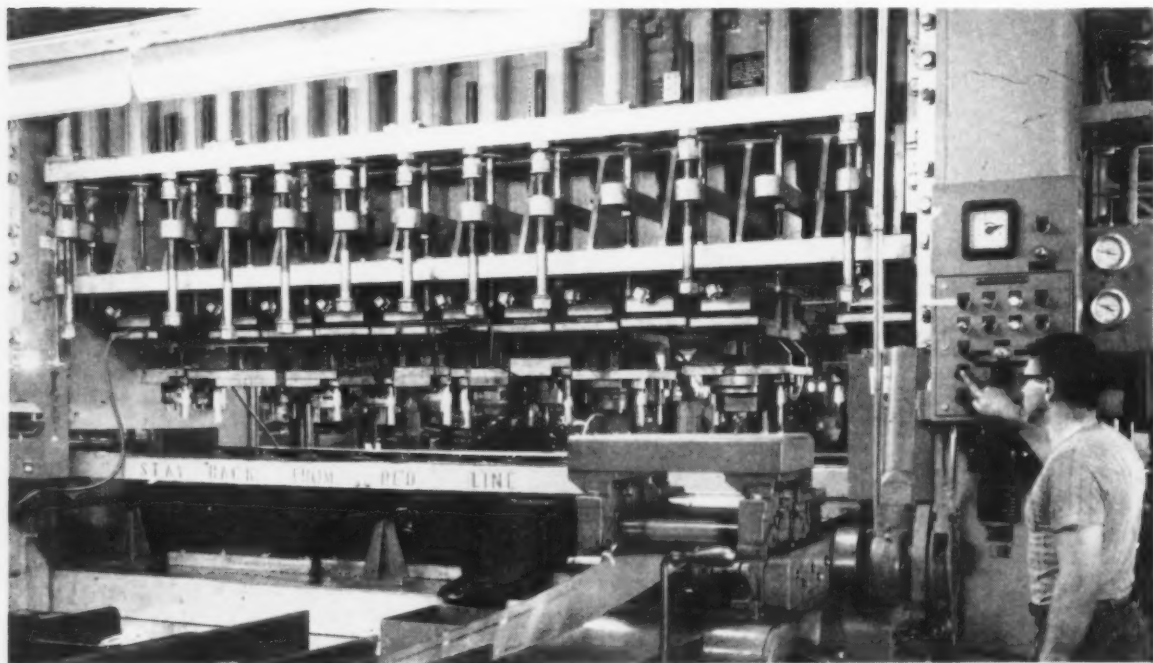
mounted in a spherical cup of sintered metal.

The oil supply in each bearing reservoir provides ample lubrication for at least five years normal operation. A window in the bearing assures positive contact between wick and shaft.

The demand for and acceptance of these design features during the two years the new plant has been in production has meant an increase in productive capacity of more than 50 pct.

It's a seasonal market. To combat this, the plant produces at a fairly even level. Stocking in slack months handles peak demands.

All work-in-process is conveyorized until it becomes a finished product ready for shipment. Motors in the new plant are manufactured in five basic production lines: end bells, laminations, shafts, stators,



**MULTIPLE STATIONS:** Progressive automatic transfer press takes coil stock through 10 stations.

and rotors. The use of automated equipment in each line gives uniform quality.

**End Bell Output**—A de-reeler passes coil stock through a straightener and roll feeder to a 600-ton automatic transfer press. This machine uses a 10-station progressive die system to blank, form pierce and trim end bells at a rate of 25 per minute.

A sensing device shuts off the machine if any end bell is not properly positioned. To protect against injury, an electronic eye shuts the machine off if the operator approaches a danger position.

A special machine simplifies end bell assembly in accomplishing wicking, bearing assembly, and oiling. It consists of a hydraulic press, a 12-station indexing table, automatic oil tube inserting device, two oil-measuring and oiling stations, and a bearing cap orienting and inserting device.

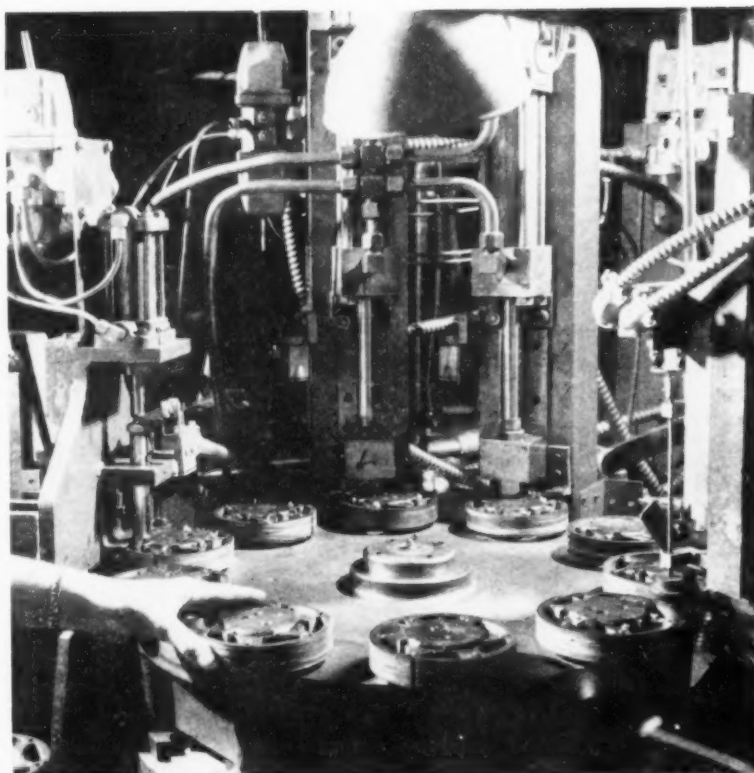
**Lamination Process** — It's automatic after coil stock is manually loaded on a de-reeler. The punch press blanks eight punchings (called cookies) per stroke at 33 strokes per minute.

The level in the feed hopper of the first lamination press controls the output of the cookie press. When cookies in the hopper reach maximum level, output ceases until the level drops to minimum. Level of punchings for two succeeding presses is controlled in the same way.

Magnetic trays and conveyors are used in the automatic transfer systems. Stainless steel pallets are used in the electrically fired annealing furnaces.

When the furnace discharges a pallet at the exit end, the furnace door at the entry end opens to admit another pallet.

**Dummy Shafts For Rotors** — Automatic vibrators orient rotor stacks over three stationary pins so that the pins line up with vent holes in the laminations. Dummy shafts, or short arbors, are then pressed through the rotor stack.



**INDEXING TABLE:** Motor laminations go through a copper-coil inserting device, and crimping and welding stations.

The rotors are manually loaded onto a die casting machine. The ram of the casting machine moves in and forces molten aluminum to all stations of the die.

After metal has chilled, the cores get ejected from the die onto the fingers of a retriever arm. The cast rotors get trimmed automatically in a trimming press which also removes dummy shafts.

An automatic turning lathe presses the rotor on a fixed arbor to turn the outside diameter. If the automatic air gaging device gauges over or under, the rotor drops into one of two reject troughs. Those in tolerance pass on to the post heat oven.

**Stator Production**—Stator punchings are assembled into core stacks and pressure measured. It's done by a machine consisting of a press and punching height indicator.

The laminations are automatically oriented by filtering over rotating bullet shaped arbors. As the lamina-

tion spins and slides down the arbor, a keyway on its outside edge matches with a key on the stationary fixture.

The stator winding area is divided for shaded-pole and permanent-split capacitor designs with winding machines for each. The winding of all poles is automatic.

For varnish impregnation, six stators are dipped simultaneously in a rise-and-fall varnish tank and conveyed through a gas-fired varnish baking oven. It's an automatic cycle.

**General Assembly** — All components of the motor arrive at the assembly area on a single conveyor. Each hanger rack on the conveyor contains components for two complete motors. Two assembly lines each have three progressive stations.

A test conveyor carries the assembled motor to a sound proof test booth. Enroute, the motor gets an automatic check for grounds.

Tests include check on operating characteristics and noise.

# Strengthen Powdered Iron Parts With Steam

By F. L. Spangler and M. E. Lackey—Leeds & Northrup Co., Philadelphia.

**Powdered metals are useful for quantity production of a variety of parts. And ways are being found to improve their properties.**

**Many manufacturers report success in steam - atmosphere heat treating such parts. Wear and strength improve.**

**Here's what the method does and how it's being used.**

■ Powdered metals are being used increasingly for mass production of a great variety of small parts, and efforts are being made to still further improve their properties. One approach—heat treating parts in a super-heated steam atmosphere—is proving practicable in increasing hardness and compressive strength.

Parts are treated at temperatures ranging from 700° to 1100°F. Steam in the forced-convection furnace produces a tightly adherent

oxide coating which effectively fills the pores in the parts.

The coating acts to improve corrosion resistance as well.

**Case In Point**—Test results on 1½-in. diam powdered iron gears are shown in the accompanying table. Tests were run on a standard Rockwell machine, both before and after steam treatment. Averages of 10 parts showed hardness increases of up to 112 pct.

Another group of parts, shown at left, were steam-treated to improve wear resistance and strength on critical bearing surfaces. The shock absorber piston in the center, as an example of results obtained, increased compressive strength of the thin-section flange around the outer edge from 1200 to 1400 psi.

The blue-black oxide coating deposited on the parts acts to improve corrosion resistance in two ways. It offers a certain amount of resistance to corrosion as deposited. And if parts are oil-dipped after steam treatment, the natural resistance of the  $Fe_3O_4$  film to corrosion is improved by its ability to hold oil.

**Easier Break-in**—The hard oxide also provides a better breaking in condition when first starting up or wearing in the part. When the original oxide on the outside surfaces wears away, the oxide in the pores continues to offer a network of hard, wear-resistant material.

Powdered iron pistons for direct-action-type shock absorbers are an illustration. Steam treating these tray-loaded parts produces an increase in hardness from Rb 60 to Rb 75. This prevents scoring and makes the parts last considerably longer.



**TREATED PARTS:** Steam puts hard  $Fe_3O_4$  coating on these parts.



Another automotive manufacturer (see illustration) finds the oxide film acts as both a lubricant and a rust preventative, as well as serving to increase hardness and compressive strength. Parts being dump-loaded include gears, cams, and shock-absorber pistons.

**Finish Helps**—The uniform, blue-black color produced on parts can sometimes eliminate the need for other finishing operations. There are many instances where wear and/or corrosion resistance can be achieved at the same time a final finish is put on the part. Both tests and practical experience with parts so treated have shown the coating adheres without cracking or chipping in handling.

A manufacturer of scale-model railroad equipment uses the method primarily for this purpose. The uniform, blue-black color requires no further finishing, when used on trucks and wheel assemblies for cars. Trucks, along with 35 to 40 other parts, are made from low-density iron powder.

**Seals Pores** — Steam treatment offers an advantage in another respect. There are instances where powdered iron would be the most economical method for producing a part, but where the necessity for complete freedom from microscopic porosity creates a problem.

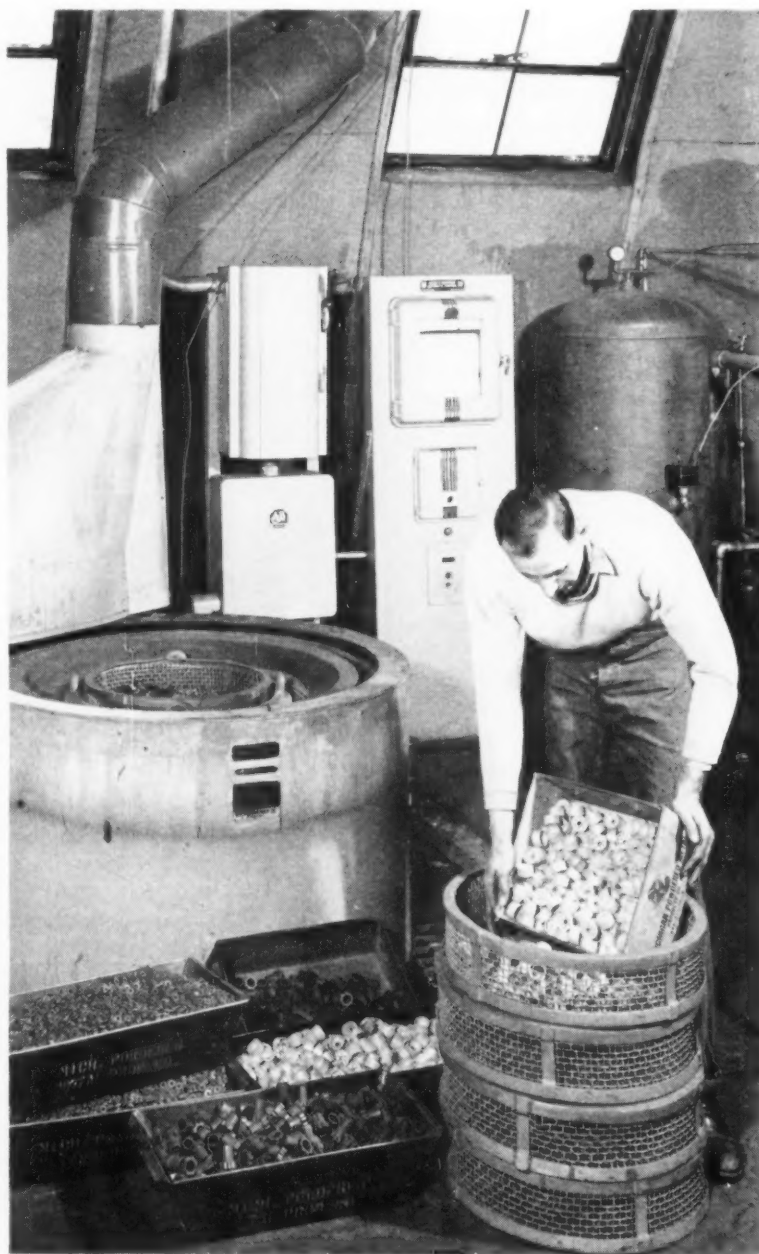
Sometimes, parts can be impregnated with plastic, copper or other material, but this is usually rather costly. It often causes a high percentage of rejects, too.

In these cases, a typical powdered iron part of 85-90 pct density which requires sealing or impregnating to prevent leakage of gas or liquids can often be steam-treated. A treatment of one hour at 1100F will satisfactorily seal the part at about 1/3 the cost of plastic impregnating and 1/6 that of copper impregnating.

It all adds up to a simple, effective way to get more out of powdered metal—one that should extend use of this versatile material to many new areas.

Part	Before Steam Treatment	After Steam Treatment	Pct Increase
Rockwell B Hardness			
Gear Teeth	53	76	43
Gear Hubs	40	89.5	112
Compressive Breaking Load in lbs			
Gear Teeth	5820	7320	26

**TEST RESULTS:** Gear properties, before and after steam oxidizing.



**READY TO GO:** Automotive parts are dump-loaded for steam treatment.

# How To Braze Titanium

By Harry Schwartzbart—Supervisor,  
Welding Research, Armour Research Foundation, Chicago

**Abstracted from a paper presented at the Metals Engineering Institute's Titanium Symposium in Los Angeles, March, 1957.**

**There are a number of ways to braze titanium—either to itself, to its alloys, or to mild steel and stainless.**

**Each system has its advantages and drawbacks. Choice of heating method, type of filler metal and selection of atmospheres and fluxes are somewhat more critical than in brazing other metals.**

**But strong, ductile brazements can be made.**

■ Titanium and its alloys can be successfully brazed and soldered. By careful attention to procedures and materials it's possible to make satisfactory brazements by a number of processes, including torch, furnace, induction and resistance heating.

Two principal factors differentiate brazing of titanium from brazing of other materials: One is the possibility that brittle intermetallic compounds might form between the filler metal and the titanium and excessively embrittle the joint; the other is a need for special fluxes and atmospheres to remove oxides on the titanium and prevent further oxidation during heating for brazing.

Titanium must be free of oxide and all other foreign matter prior to brazing. Contaminants such as oil and grease may be removed with solvents, and a pickling treatment removes light scale. Pickling solutions can be 2 pct hydrofluoric acid and 10 to 47 pct nitric acid,

50 pct orthophosphoric acid at 150°F, or 10 pct hydrofluoric acid. Wire brushing may be used after the pickling treatment. Sanding is a satisfactory method of preparing surfaces on flat products.

Heavy scales may be removed by sand or grit blasting. This should be followed by further treatment, usually pickling, to make certain no residues remain to contaminate the braze or impair wettability. Vapor blasting or chemical cleaning may also be used to remove heavy scales.

**Atmosphere Is Preferred** — Because fluxes raise the probability of flux entrapments and thus weaker joints, it's preferable to use a shielding gas such as helium or argon to prevent oxidation during brazing. This permits brazing on finish machined parts without fear of oxidizing the surfaces. It also eliminates the need for post-brazing cleaning.

In some cases a tank gas may be used without drying, but it's good insurance to provide a drying train between the cylinder and the brazing furnace or retort.

Brazing of titanium can also be accomplished without fluxes in a vacuum. Armour Research Foundation has done extensive work on the cladding of mild steel with titanium by the Hortonclad Process, which is a patented vacuum brazing process developed by Chicago Bridge & Iron Co.

**Heating Methods Vary**—Factors influencing choice of heating method include shape and size of part, available equipment, composition of base and filler metals, and desired strength.

Furnace brazing cycles are longer than those for other heating methods and therefore present the greatest possibility of mutual diffusion and intermetallic compound

formation. But furnace brazing does lend itself to inert gas shielding, and to brazing complicated parts which may be difficult or impossible to heat by more rapid methods.

**Torch Has Limitations**—Torch-brazing cycles are shorter than in furnace brazing. But it requires flux, which raises the likelihood of entrapments and makes it necessary to remove the flux residues. There's also the possibility of oxidizing titanium surfaces some distance from the actual joint. A further disadvantage is the need for increased operator skill.

Both slightly reducing and neutral oxy-acetylene flames are used. Fluxes can be dry or in paste form. The filler metal must be in contact with the capillary during heating; if not, overheating might occur, the flux will become encrusted, and wetting action will slow. The filler metal should either be preplaced in the joint, preplaced adjacent to the joint but contacting the capillary, or held so that it contacts the capillary during heating.

**Induction Brazing Is Faster**—Induction heating is attractive for brazing titanium because of its speed. It is easily adaptable to inert gas shielding, either by doing the work under a bell jar or placing it in a glass tube which fits inside the induction coil. The chief disadvantage is that it can't be applied to complex parts or joints. Distortion is sometimes a problem.

Resistance brazing of two types has been investigated. In one a spot-welding machine is fitted with square copper electrodes and a small lap brazement is made. Uneven pressure and current distribution, which cause uneven heating, limit this method to small braze areas.

Brazing can be accomplished in

air without a flux. A shim of the filler metal is placed between the sheets to be brazed; electrode pressure makes contact intimate enough so flow isn't inhibited by oxidation of the surfaces or filler. If electrode pressure is too high, filler metal squeezes out and the titanium is indented.

#### Candidate For Honeycombs —

The other approach to resistance heating involves passing current through a metal part which can be one of the members being brazed or simply the source of heat for other members. It's being studied primarily as a means for brazing honeycomb sandwich panels.

Salt bath brazing has been tried, but for the most part hasn't yielded consistently good results.

Are heating, because of its high rate of heat input, offers some attractive possibilities. Investigators have tried helium shielded carbon-electrode arc heating coupled with a commercial titanium flux and a filler metal consisting of 45 pct Ag, 15 pct Cu, 16 pct Zn and 24 pct Cd.

#### Silver Makes Best Filler —

A common characteristic shared by practically all metals which might be considered as fillers is that they form brittle intermetallic compounds with titanium. The intermetallic compound of titanium and silver is an exception, however, in that it is relatively ductile. For this reason, silver and its alloys are the favored filler metals for brazing titanium.

Table I lists some of the more popular silver-base alloys used for brazing titanium.

Fine silver and silver-manganese alloys are relatively high melting, while the other alloys which contain copper, zinc, cadmium or nickel are completely molten at temperatures as low as 1145°F. All are commercially available in a variety of forms.

#### Lithium Improves Brazing —

Current experiments are concerned with addition of lithium to silver-base alloys to increase wettability

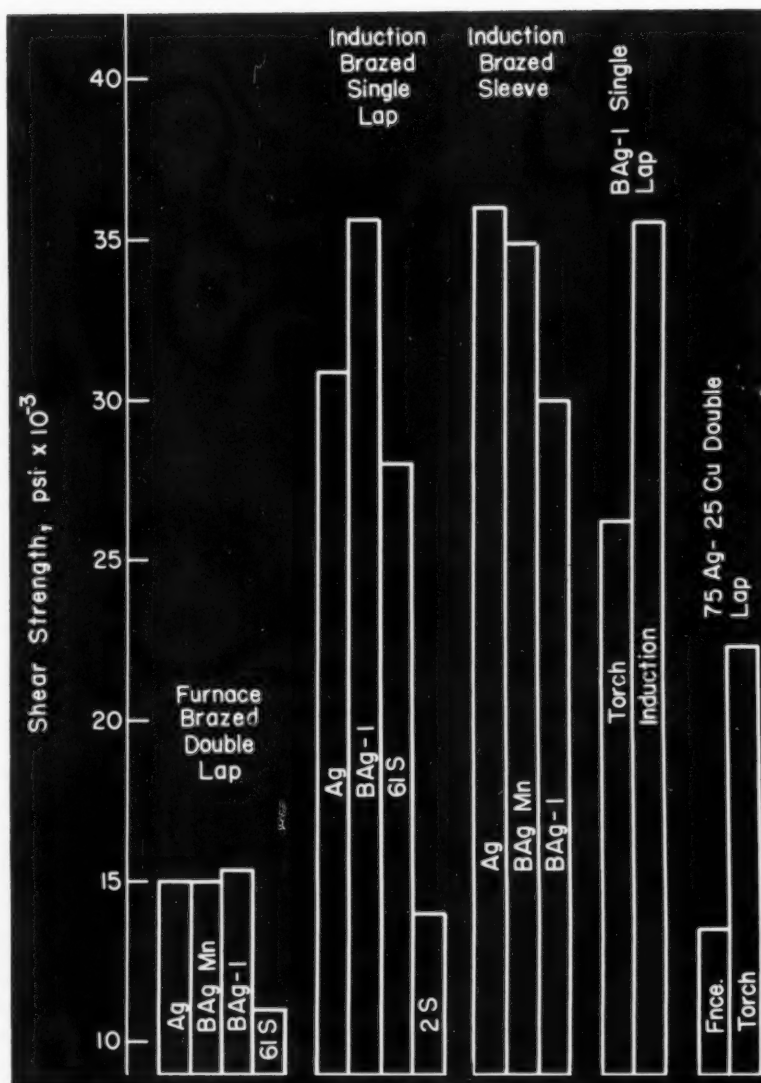


FIG. 1: Effect of filler metal composition and choice of brazing method on shear strength of brazed joints.

and lower the melting point. Addition of lithium to brazing alloys to make them self-fluxing and/or air-proof has been under development at Armour Research Foundation for the last few years. Some such lithium-bearing alloys are now commercially available from Handy & Harman.

**Usually Test In Shear —** Most evaluation of brazed titanium joints has been by shear testing. Many tests are in common use, including single-lap sheet, double-lap sheet, tension and compression plug and ring, and nib on plate.

It's impossible to compare, say,

the effect of filler metal composition by using single-lap shear results for one composition, with double-lap shear results of another composition. Everything must be identical except filler metal composition.

Fig. 1 shows effects of filler metal composition and brazing method on shear strength of brazed joints in commercially pure titanium. The first group is for furnace-brazed double-lap specimens. Shear strengths are about 15,000 psi for the silver alloys with practically no difference in strength between fine silver, silver-manganese, or BAg-I, the silver-copper-zinc-cadmium al-

loy. (Values plotted are averages of several tests).

The next group, which is for induction-brazed single-lap specimens, shows BAg-1 to have the highest strength.

**Positions Reverse**—The order of strengths for the silver alloys changes in the next group, which is for induction-brazed sleeve specimens. Here the strongest joints are made with fine silver; the silver-

manganese alloy gave joints almost as strong, and BAg-1 ran 30,000 psi.

The next two groups show the effect of brazing cycle on shear strength. Here again the shorter brazing cycle yields the higher strength.

Sleeve-type brazements made with a nickel-base alloy containing 52 pct Ni, 28 pct Ti, 15 pct Cu and 5 pct Co had an average compressive shear strength of 59,300

psi and an average tensile shear strength of 43,000 psi. The same investigators report that brazements made with a filler alloy containing 64 pct Ti, 26 pct Ni, and 10 pct Cu have an average compression shear strength of 37,500 psi.

In an extensive investigation of titanium-base filler metals fifty-four compositions were studied. The study embraced binaries and ternaries of titanium and copper, iron, manganese, nickel, silicon and silver.

**High Strength Results** — Shear strengths of single-lap joints made with these alloys were generally high, sometimes exceeding 50,000 psi; failure sometimes occurred in the parent metal, indicating brazes stronger than the base metal itself. Ductility was generally low. Strength generally decreased with increasing alloy content, but the alloy content is necessary to lower the melting point of the filler metal.

Stress-rupture characteristics of torch-brazed double-lap joints with BAg-1 and 75 pct Ag—25 pct Cu are presented in Table II. The data scatter considerably, but some indication of expected life at 600°F and 800°F as a function of stress can be obtained.

**Joints Held**—Fatigue properties of torch-brazed single-lap joints are shown in Fig. 2 and 3. Fig. 2 contains data on joints tested in pull-pull direct stress, and Fig. 3 on joints tested in bending. All specimens tested with the exception of one failed in the parent titanium sheet.

Data on salt-spray corrosion tests have been reported by two investigators. Single-lap joints, brazed by inert-gas tungsten arc with fine silver and aluminum-base filler metals, were subjected to a 250-hr salt spray test in accordance with Specification QQ-M151a. Panels brazed with fine silver filler showed crevice corrosion at the silver-titanium interface.

Aluminum-brazed specimens exhibited no crevice corrosion, but a considerable quantity of white cor-

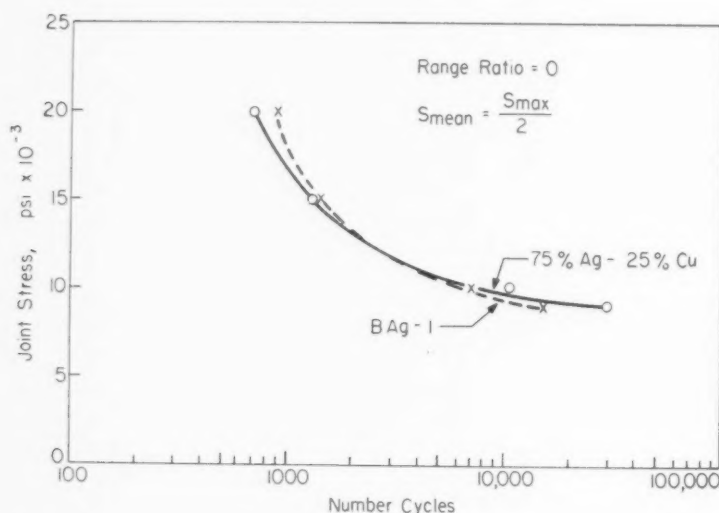


FIG. 2: Fatigue properties of single-lap joints torch-brazed with silver-base alloys, pull-pull direct stressing

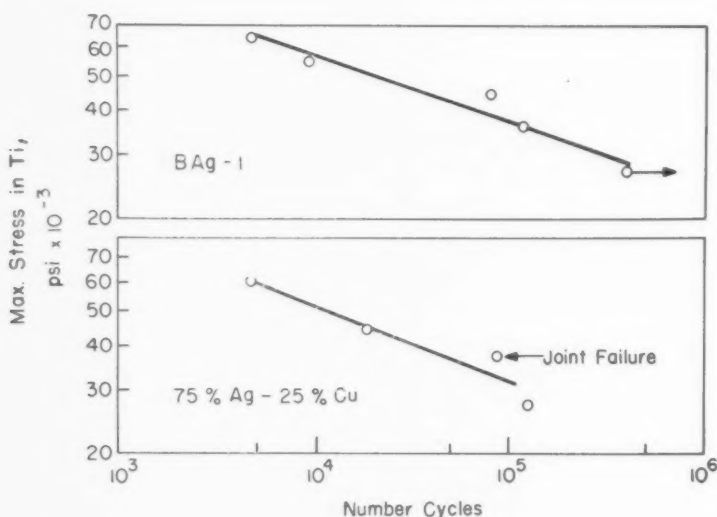


FIG. 3: Fatigue properties of single-lap joints in titanium torch-brazed with silver-base alloys, reverse bending.



rosion products formed on the surface of the bead. In this case, joint strength was unaffected.

On the other hand, single-lap joints induction-brazed with fine silver showed no weight loss or visible indication of corrosion after 672 hrs in a 20 pct salt spray fog at 95°F.

#### Same Methods For Alloys —

Very little work has been done on brazing titanium alloys, although the same procedures and materials used for pure titanium apply.

One additional factor applying to titanium alloys is the possible adverse affect of brazing on the heat-treated properties of the alloy. This can be prevented by (1) brazing at a temperature below the heat treatment temperature of the alloy; (2) using a brazing process such as induction or torch which heats only the joint area, and a structure design which will permit lower strength at the joint area without hindering functions of the part; and (3) heat-treating after the brazing operation has been completed. A disadvantage of the latter course is that it will cancel out the benefits obtained from a shorter brazing cycle.

Shear strength of brazements in titanium alloys is about the same as that for commercially pure titanium.

**Brazing To Steel**—Titanium has been successfully brazed to mild steel and stainless steel. Special techniques are needed for consistently good brazements. High strength titanium-mild steel joints are made by induction heating, without a flux, using either silver or BAg-1 as the filler metal. Shear strengths of sleeve joints are about 24,500 psi, and of single-lap joints, about 26,000 psi. Average shear strength of sleeve joints brazed identically but using BAgMn filler metal is 18,800 psi.

The highest strength torch-brazed joints result when the mild steel is first precoated with BAg-1 filler using Handy-flux, then brazed to the titanium with BAg-1 filler and a flux containing 10 pct AgCl.

**Table I**

#### Commercial Silver Alloys Used For Brazing Titanium

AWS Filler Metal Classification	Ag	Cu	Zn	Cd	Ni	Mn	Solidus Temp., F.	Liquidus Temp., F.
Fine silver	99.9 +						1760	1760
BAg-1	45	15	16	24			1125	1145
BAg-1a	50	15.5	16.5	18			1160	1175
BAg-3	50	15.5	15.5	16	3		1195	1270
BAg-6	50	34	16				1270	1425
BAg-8	72	28					1435	1435
BAg Mn	85					15	1760	1780

**Table II**

#### Stress - Rupture Characteristics of Torch-Brazed Double Lap Joints

Brazing Alloy	Temperature, F.	Joint Area, sq in	Stress in Joint, Psi	Stress in Titanium Sheet, Psi	Fracture Time, hrs
75 Ag-25 Cu	600	0.25	2,000	8,000	499.0
		0.25	4,000	16,000	500.0
		0.25	6,000	24,000	21.5
		0.25	8,000	32,000	0.05
BAg-1	800	0.25	500	2,000	24.0
		0.25	1,000	4,000	33.0
		0.25	2,000	8,000	0.11
		0.25	4,000	16,000	0.05

36 pct KCl, 9 pct LiF, and 45 pct SrCl<sub>2</sub>.

Vacuum brazing by the Horton-clad process has been used to produce strong, ductile titanium-clad mild steel. It's done with BAg-8 filler metal.

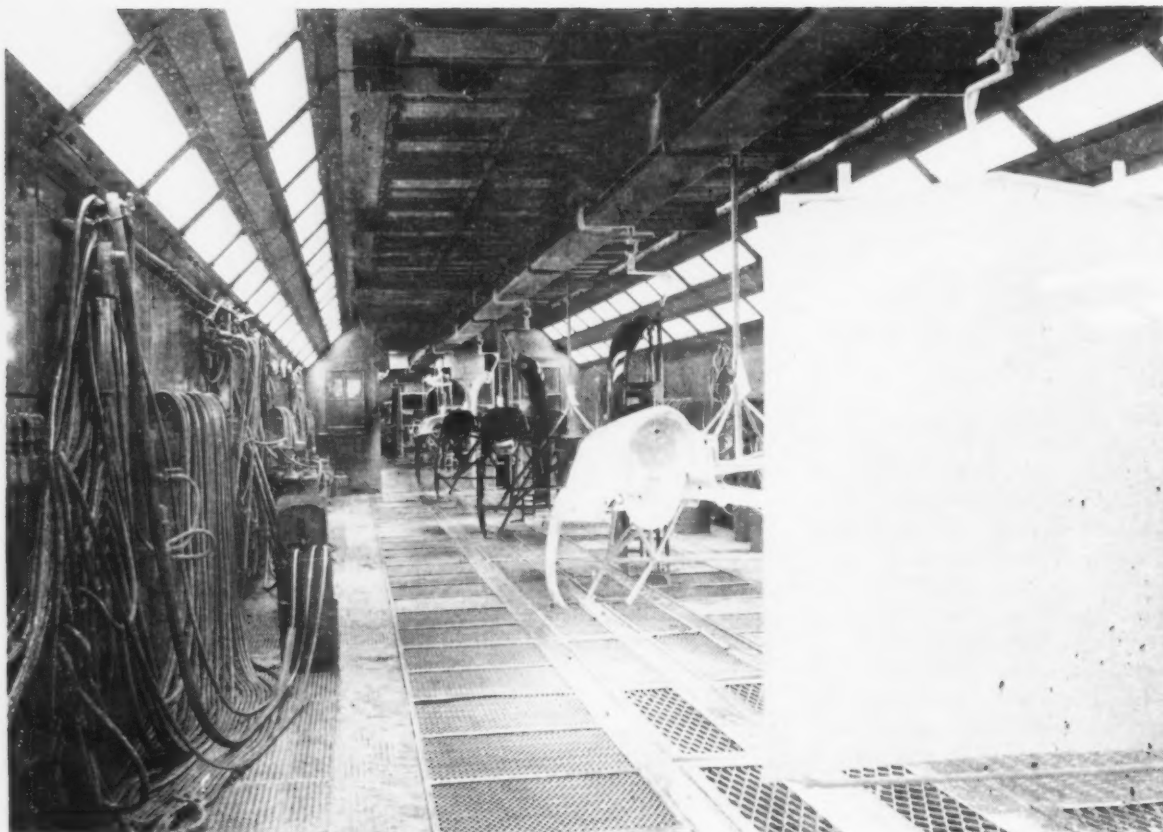
**Titanium To Stainless**—Brazing titanium to stainless steel is more difficult. Higher strength induction-brazed joints are obtained by precoating the stainless steel with BAgMn, then brazing the coated stainless to the titanium with silver. Average shear strength of 32,650 psi results.

Shear strength of the best torch-brazed joints made in tests was about half that of induction-brazed joints. The strongest joints were

obtained either by precoating the stainless steel with BAg-1, and brazing with the same alloy, or by precoating the titanium with silver, and the stainless steel with BAgMn, then brazing the two with BAgMn.

The limited work which has been done on soldering titanium has shown that it's generally necessary to precoat the titanium with a solderable material such as silver, copper or tin. Tin-lead solders will not wet or adhere to titanium but they will adhere to precoated surfaces.

Only one exception to the need for precoating has been reported. Soft solder was applied directly with a tungsten electrode arc torch and argon shielding.



**MINOR ALTERATIONS:** Converting a booth for hot spray painting requires very few changes.

## Get Better Finishes For Less With Hot Paint Spray

By W. G. Patton—  
Engineering Editor

**Hot spray painting offers many advantages. Added up, they spell better quality finishes at lower cost.**

**One firm, in particular, has learned a lot about hot paint spray techniques.**

**Ford Motor Co.'s new Edsel car will be the first to get the full treatment.**

■ The first 100 pct. hot spray painting installation in the automobile industry should be credited to Mercury Div., Ford Motor Co. New equipment being installed at Somerville, Mass., will be used to paint the new Edsel car to be introduced this fall.

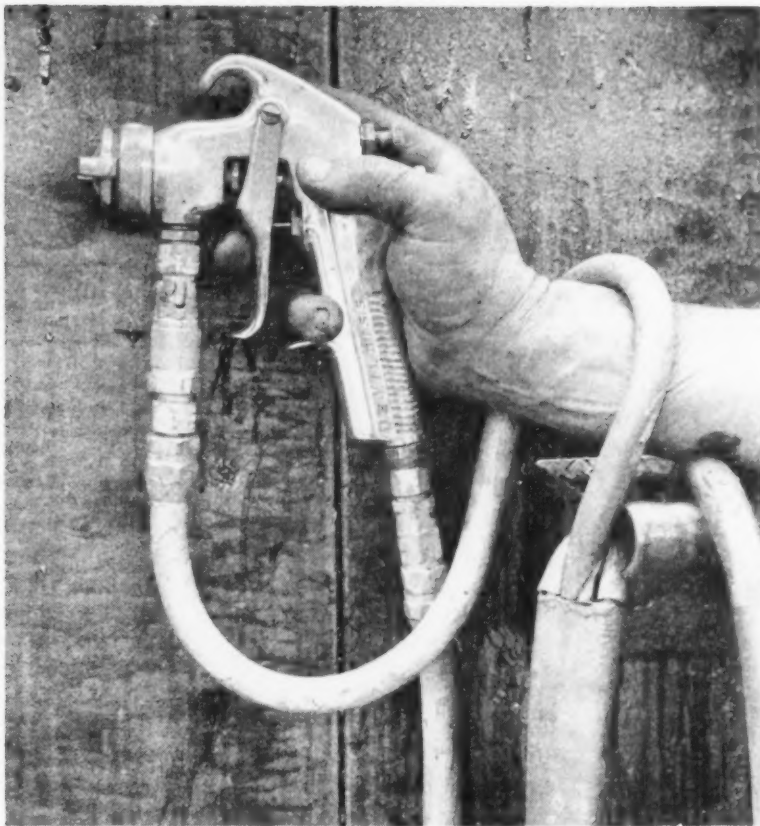
The firm's decision to use hot spray on the new car for both primer and color coats follows extensive experimental and commercial use of this technique at its Wayne, Mich., plant.

Engineers from the DeVilbiss Co., Toledo, cooperating with Mer-

cury engineers and chemists, developed the new techniques over a period of several years in which hot spray was used for ground coats only.

**Yields Many Benefits**—Hot spray painting offers the following advantages:

1. A heavier film buildup.
2. Paint savings up to 30 pct.
3. Less physical effort is required since desired buildup is obtained with fewer passes.
4. Overspray is reduced substantially, thus maintenance costs are also reduced.



**HOT ON DELIVERY:** Water jacketed paint hose keeps paint hot (about 140°F) all the way to the point of discharge from the spray gun.

5. Wet sanding costs are reduced as much as 25 pct in some instances.

6. Less over-run and lapping.

7. Low atomizing pressures are used.

**Simple And Safe**—Spraying paint hot is not new. What is new about the DeVilbiss method is the fact that it is simple, foolproof and safe. Paint savings, improved quality of the job and other benefits more than offset the cost of paint-heating equipment. Hot spray can be used, incidentally, with either a manual, automatic or electrostatic system.

Mercury's new setups, both at Wayne and Somerville, eliminate many of the problems that previously plagued attempts at hot spraying.

For example, the hot water heating system is entirely separate from the paint circulation system. Furthermore, the problem of localized overheating (which might

cause paint buildup or clogging) is eliminated.

Abrasive action in pumps circulating hot paint has also been eliminated. Moreover, there are no moving parts in the hot water system other than the pump.

**Keep Paint Hot**—Paint is heated to 140°F by hot water (180°F) passing through a heat exchanger. A water-jacketed hose keeps the paint at this elevated temperature right up to the spray gun. Hot water can be run through 50 ft of hose without excessive heat loss.

The reduction in atomization pressure that hot spray painting allows is important, too. At Mercury's Wayne plant, an atomization pressure of 50 lb does the job. Conventional cold spraying requires a pressure of about 80 lb.

The need to use special thinners and retarders because of potential changes in atmospheric conditions

has been eliminated, also.

**Fewer Problems**—Use of heated paint means greater latitude for operators. The likelihood of getting "orange peel," sags, thin films or dry spray is minimized; better flow-out of the hot paint helps prevent rejects and rework; and reduced fog or spray mist makes work easier, particularly where there are rebound problems.

Spray booths, exhaust fans and stacks require less cleaning where hot spray is used. Consistent results are obtainable over a wide range of temperatures and despite rapid, unpredictable changes in atmospheric conditions. Ability to control viscosity very closely contributes to this much desired result.

In the body line at the Wayne plant, two undercoats are applied hot in a 100-ft long spray booth. First is a red oxide priming coat, requiring a setup time of about one minute. This is followed by a neutral gray prime surfacer.

Prime painting is followed by baking, wet sanding and conventional cold spray color applications.

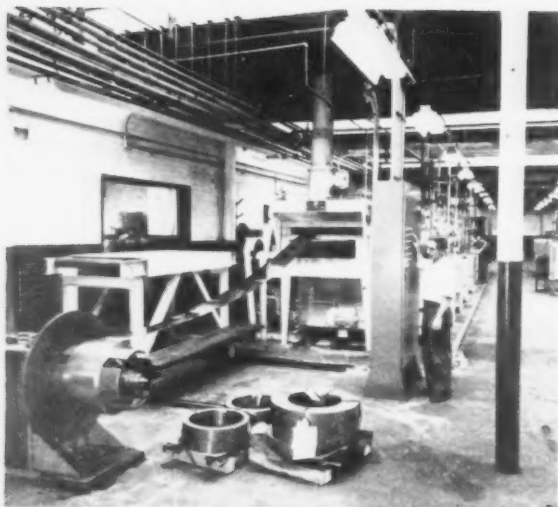
**Two Colors Best** — Use of two colors for ground coats is unusual for the auto industry. But Mercury paint experts feel this produces at least two advantages: (1) thin spots are readily detected, (2) the red undercoat warns the wet sander not to remove too much paint.

The amount of special equipment required for hot spraying is not extensive. Mercury uses a 6 kw heating unit for each gun. Heaters ranging from 3 to 12 kw are available.

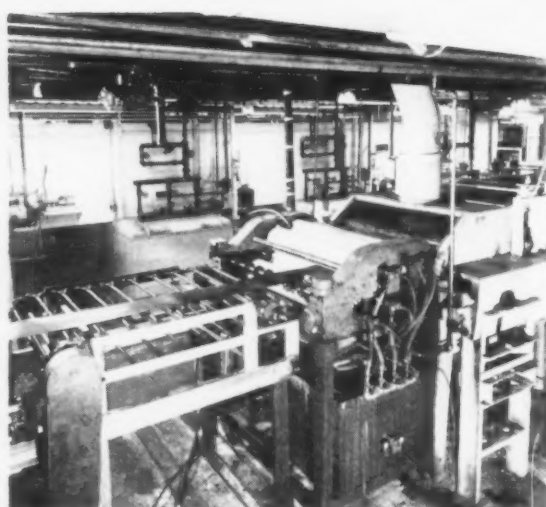
The apparatus operates on the double boiler principle. Temperature at the heat exchanger is held in the range of 120° to 160°F.

The hot spray method drives off the low boiler thinners that are generally believed to cause runs. It also deposits more solid material in a single application.

A number of auto makers are now using hot spray to a limited extent. Mercury, however, is the first to go all out for this promising new metal finishing technique.



**CONTROLLED STEPS:** The operator starts automatic operation on panel. Each step gets close analysis.



**UNIT METHOD:** The roller coating unit can be removed from the line and replaced by spray unit.

## Laboratory Simulates Production To Check Coatings

**New processes are coming to the fore in finishing of sheet metal stock.**

**But it's expensive to test a treatment before setting up a production line.**

**Even then the control of quality is uncertain. It calls for laboratory conditions.**

▪ Metal finishing operations on strip and sheet steel and other flat rolled materials often start out with uncertain tank testing and expensive pilot line checks. A new laboratory set-up for continuous treatment eliminates such procedures.

The Parker Rust Proof Co. laboratory installation at Detroit features a new 75-ft machine, automated to handle strip for rinsing and phosphate coating. It has facilities for spraying stock with special compounds for treatment prior to forming, or for adding a corrosion preventive base.

**Stresses Flexibility**—The laboratory operation simulates almost any production line condition. Industry can take advantage of the new facility for the solution of problems relating to treatment of sheet stock. This means insuring satisfactory paint base or treatment prior to cold forming.

A number of firms have called on Parker to run tests to check on automated metal finishing processes. Previously, it was difficult to duplicate service conditions to make such checks. Both cost and performance can now be evaluated prior to building new facilities.

**Production Too**—In addition to offering its production line to steel mills and plants for development work, Parker is already processing production size lots of stock or parts at its new laboratory.

The laboratory, costing \$300,000, handles coils up to 18 in. wide, weighing up to 3000 lb. It processes stock up to 36 in. wide.

The company is also offering its facilities for salt spray and humidity tests. The tests are run in room size chambers under carefully controlled conditions.

**Wide Treatment** — Multiple phase treatments can be set up quickly in the automated line. For instance here is typical cycle: Cleaning, two heated water rinses, lubricant coating, cold water rinse, water conditioned rinse, lubricant coating and dry-off oven.

The unit applying cold forming lubricant is interchangeable with a disc type conveyor or an alternate roller coater for application of special coatings or rinses.

Operation of the new automated line shows that treatments can now be determined without the initial outlay of large sums for pilot equipment.

Parker is currently experimenting with a "tinless" process on tin cans for the canning industry.



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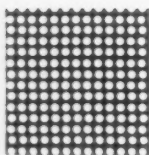
**RUSH!**

**RUSH!**

## Perforated Steel Sheets from Stock

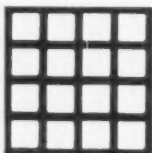
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**H&K**



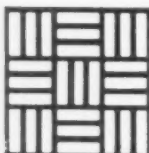
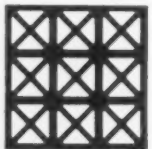
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☐ STOCK LIST of Perforated Steel Sheets

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## FREE TECHNICAL LITERATURE

# New Catalogues And Bulletins

**Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 113.**

## Carbide Drills

Carbide drills appear in a folder. These tools are for drilling hardened steels, Rc 40 to 65. Sizes in stock, it says, include 1/16 through 3/4 in. (Chicago-Latrobe)

For free copy circle No. 1 on postcard, p. 113

## Clutch, Brake

A 4-page brochure illustrates a pneumatic friction clutch and brake unit. (E. W. Bliss Co.)

For free copy circle No. 2 on postcard, p. 113

## Vibrating Handlers

High-speed vibrators for moving granular matter are detailed in a 36-page catalog. Many models appear. (Martin Engineering Co.)

For free copy circle No. 3 on postcard, p. 113

## Rivets

Metal-to-metal blind rivets are outlined in an 8-page booklet. It shows how these hammer-drive rivets work and lists specifications. (Star Expansion Industries, Inc.)

For free copy circle No. 4 on postcard, p. 113

## Fabricating

Custom metal fabricating facilities of a large job shop are reviewed in a folder. It illustrates many operations available for processing steel, stainless or aluminum in 30 gage to 1/2-in. plate, in continuous

lengths to 20 ft. In addition, the firm does all common types of welding; finishing operations include degreasing, phosphatizing, dip or spray painting and baking. (United Steel Fabricators, Inc.)

For free copy circle No. 5 on postcard, p. 113

## Conveyor Coupling

"To make ends meet," advises a folder, "drop it in the slot." In this publication, "it" refers to a conveyor end plate; "slot" describes the slotted top of an adjustable stand which serves as a conveyor coupling. The folder details the conveyor coupling in full. (E. W. Buschman Co.)

For free copy circle No. 6 on postcard, p. 113

## Mercury Switches

Mercury switches for pulse circuits appear in a data sheet. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 7 on postcard, p. 113

## Dressing Tools

Diamond dressing tools are described in a folder. (Crane-Schwartz Diamond Tool Co.)

For free copy circle No. 8 on postcard, p. 113

## Plastic Pipe

Pressure-rated plastic pipe is described in a booklet. It also covers fittings. (Crane Co.)

For free copy circle No. 9 on postcard, p. 113

## Controls

Automatic "package" controls appear in a 16-page catalog. These are for use where chemical or mechanical functions can be measured elec-

trically. Applications include control of: temperature, torque, viscosity, current, voltage, timing welding, conveyor overload, speed, plating, battery charging, radiation, moisture content, pressure, deflection, thickness, weight, color and light. (Tipp-Tronic, Inc.)

For free copy circle No. 10 on postcard, p. 113

## Dial Indicator

A company's reading matter describes a highly sensitive, finger-type dial indicator. This instrument has a clear vision dial graduated to 0.050 (the range of the indicator is 0.075). (M & G Instrument Co.)

For free copy circle No. 11 on postcard, p. 113

## Gearmotors

Gearmotors and packaged drives are dealt with in an 8-page booklet. It illustrates horizontal, vertical, right angle, open, enclosed, explosion-proof, ac and dc units. (Westinghouse Electric Corp.)

For free copy circle No. 12 on postcard, p. 113

## Hydraulic Power Units

In its 52 pages, a catalog lists 2240 different types of hydraulic power units. These include pumps, cylinders, pressure switches and accessories. (Oil-Dyne, Inc.)

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## Sine Plate

Illustrated literature offers data on a reliable means for establishing precise angles for surface grinding, toolmaking and inspection. It deals with a sine plate with an overall accuracy within  $\pm 0.0002$  in. (Brown & Sharpe Mfg. Co.)

For free copy circle No. 14 on postcard, p. 113

## Cranes

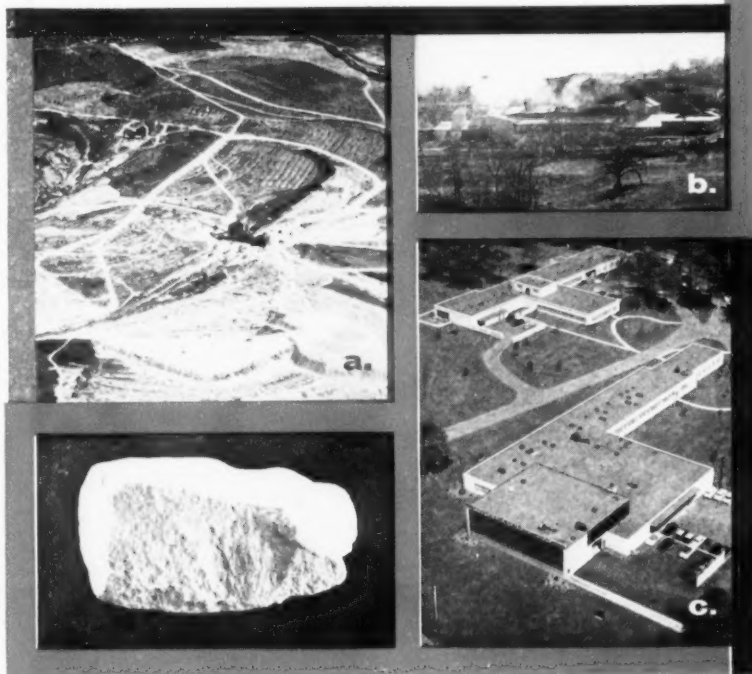
Cranes with capacities through 20 tons and spans through 80 ft are covered in a bulletin. It shows 16 cranes. (Manning, Maxwell & Moore, Inc.)

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## Hydrofluoric Acid

Safe handling and use of hydrofluoric acid is stressed in a chemical safety data sheet. This 46-page

## Chemstone earns its place as your fluxstone supplier



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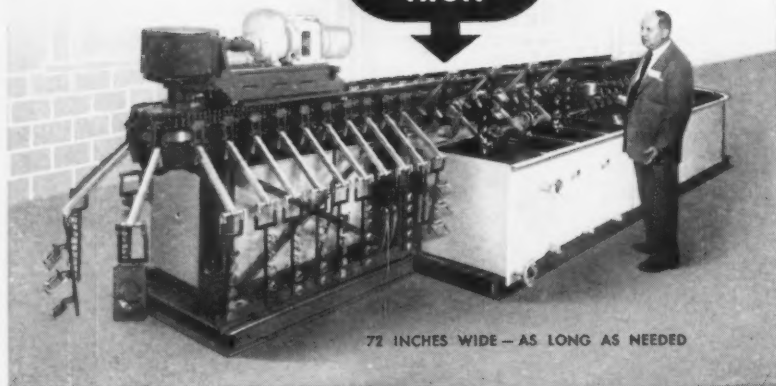
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Yes, this new immersion processing machine by Stevens can process up to 40,000 pieces per day — and it has a variety of other uses too.

Ruggedly built, "Little Steve" can be obtained at a surprisingly low initial cost. It is ideal for large or small companies for it will fit many production cycles. It uses an arm as a rack or will take racks for small parts.

Being of small size it offers no floor space or load problems; involves low solution expense and means a small capital investment. It can be used easily as a laboratory testing machine.

For further information about "Little Steve" write for illustrated folder or call your local Stevens sales engineer.



WAREHOUSES AND OFFICES  
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## FREE LITERATURE

booklet covers properties and essential information on both anhydrous and aqueous hydrofluoric acid. It's a revision of a 1948 safety sheet set up by the Manufacturing Chemists' Assn. (The Harshaw Chemical Co.)

For free copy circle No. 16 on postcard, p. 113

## Machine Tools

Exactly what happens to machine tools when they go to a rebuilding plant for modernization? A company in this business gives the answer in a new publication. It shows, step-by-step, how they are disassembled, cleaned, inspected, fitted with new parts, etc. (Simmons Machine Tool Co.)

For free copy circle No. 17 on postcard, p. 113

## Air-moving Units

Air-moving equipment is reported on in a 24-page folder. It covers engineering and test facilities for propeller fans, specifications, construction, maintenance and installation. (Aerovent Fan Co.)

For free copy circle No. 18 on postcard, p. 113

## Heat Treating

Production heat treating of gears and parts in a continuous gas carburizer with controlled atmosphere equipment is shown in a new publication. (Surface Combustion Corp.)

For free copy circle No. 19 on postcard, p. 113

## Fabricating

Steel fabricating is the subject of a dozen-page brochure. It shows equipment fabricated by one firm for many different metalworking shops and plants. (McGregor-Michigan Corp.)

For free copy circle No. 20 on postcard, p. 113

## Die Casting

Comprehensive standards covering the principal provisions specific to die casting purchasing contracts are now available to buyers of die castings. (American Die Casting Institute, Inc.)

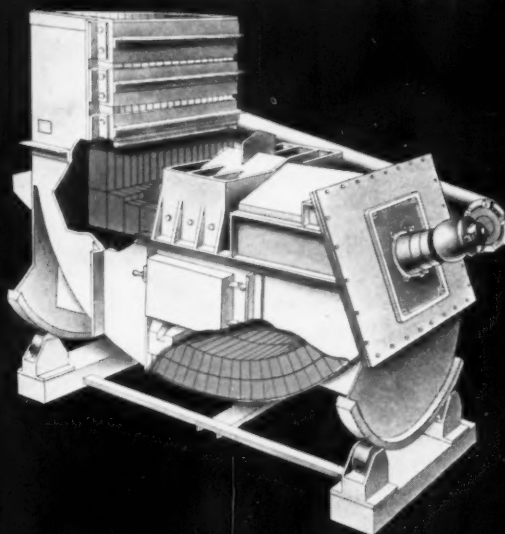
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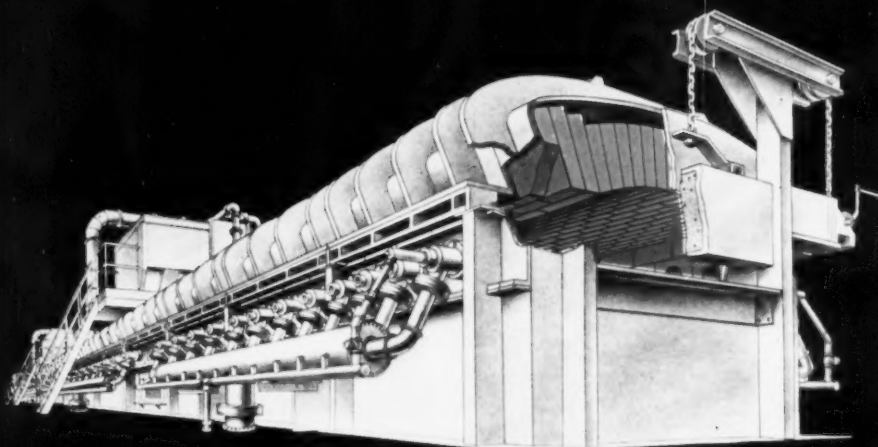
**Why**

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Direct-fired reverberatory furnace for melting brass, aluminum, and iron. For longer refractory life, B&W Allmul Firebrick are used to line the bath and arch.



◀ In this type of furnace for continuous high speed heating of strip for welding into pipe, temperatures in excess of 3000 F are common and the atmosphere is contaminated with iron oxide. Because of their resistance to spalling and metal penetration, B&W Allmul Firebrick have set new standards for refractory life in bungs, burner blocks and recuperators.

B&W Allmul Firebrick stand up under extremely high temperatures at continued high rates of operation because they are produced from electrically melted mullite grain by a highly efficient process. These top-quality brick have high hot-load strength, high resistance to spalling, good volume stability and a melting point of 3335 F.

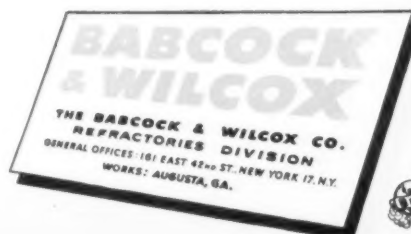
They are practical from a cost standpoint for a wide range of applications

in the ferrous and non-ferrous metal industries. Illustrated on this page are a butt-weld furnace as well as a direct-fired reverberatory furnace. Other services are direct and indirect-arc electric furnaces, air furnaces, furnace hearths subject to iron oxide scale attack, crucible melting units and furnaces melting many non-ferrous metals and alloys.

Your B&W representative can show you how B&W Allmul can lower your

refractory costs in many heavy-duty services. Consult him or write for Bulletin R-34A, giving data on B&W Firebrick for exacting services.

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## LEADED STEELS LATEST INFORMATION

New 16-page booklet presents latest information on basic characteristics, mechanical properties and workability of Aristoloy Leaded Steels. Test results are supported by complete data and charts. Also contains several pages of case histories based on manufacturers' experience and documented by time study records, showing actual savings in reduced machining time and increased tool life.

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## FREE LITERATURE

This section starts on Page 108

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

### Zinc Anodes

Two reference manuals deal with zinc as a galvanic anode to protect iron and steel from corrosion. Information contained is based on a 6-year study of both underground and underwater problems. (American Zinc Institute.)

For free copy circle No. 22 on postcard

### Cutters

Single point cutting tools are listed in a 24-page catalog. (Viking Tool Co.)

For free copy circle No. 23 on postcard

### Centrifugal Pumps

A 16-page bulletin features general-purpose, centrifugal pumps. These pumps come in six sizes with 100- to 3500-gpm capacities. (Ingersoll-Rand Co.)

For free copy circle No. 24 on postcard

### Chromallizing

A technical report covers the wear resistance of chromallized iron and steel. It discusses a method of hard-surfacing these metals by diffusion. (Chromalloy Corp.)

For free copy circle No. 25 on postcard

### Casters, Wheels

Casters and wheels are listed in a new catalog. (The Fairbanks Co.)

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### Fasteners

Now you can fasten items to lightweight materials (i.e., aluminum) as thin as 0.031-in. A folder tells how. It's made possible by a new fastener. This device forms a

bond with the steel material. Then, a bolt is screwed into the fastening device's load-bearing ID threads. The bolt can, of course, hold both thick or thin items. (My-T-Grip Mfg. Co., Inc.)

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### Pneumatic Drives

Pneumatic power drive units are described in a bulletin. These units remote — operate and position valves, dampers, louvers, rheostats, vanes and variable-speed drives. (Copes-Vulcan Div., Blaw-Knox Co.)

For free copy circle No. 28 on postcard

### Silicon

An 18-page booklet discusses silicon. It analyzes the material's relationship to the electronics industry. (For free copy, write on company letterhead to Aries Laboratories, Inc., 41 E. 42nd St., New York 17, N. Y.)

### Steel Cabinets

Steel cabinets appear in a 4-page bulletin. (Penco Metal Products Div., Alan Wood Steel Co.)

For free copy circle No. 29 on postcard

### Skin Protection

Skin creams to protect workers' hands from various industrial irritants are pictured in a bulletin. It describes skin coatings for safety against organic liquids such as kerosene, chlorinated hydrocarbons, paints, and also from water soluble materials such as cutting oils, etc. (The Boyer Campbell Co.)

For free copy circle No. 30 on postcard

### Drives, Couplings

A new 4-page bulletin describes dry fluid drives and couplings. These are for use with motors rated to 75 hp at 1750 rpm. (Dodge Mfg. Corp.)

For free copy circle No. 31 on postcard

### Compressor Air

Contamination present in all air that comes from compressors is discussed in a catalog. It looks into

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Circle numbers for Free Technical Literature or Information on New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
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31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

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THE IRON AGE

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NEW YORK 14, N. Y.

## FREE LITERATURE

the damage contaminants cause and outlines a device that does away with all this. Illustrated is a unit that removes 92 pct of all moisture, oil, dirt and fine scale in the air line before such foreign matter can take its toll in damaged equipment or fouled-up work. (Logan Engineering Co.)

For free copy circle No. 32 on postcard

## Propeller Fans

Propeller fans are reviewed in a 32-page catalog. A revision of an older edition, it contains some new specifications, air deliveries, performance data. (Hartzell Propeller Fan Co.)

For free copy circle No. 33 on postcard

## Fasteners

A catalog covers aircraft-type fasteners. (Huck Mfg. Co.)

For free copy circle No. 34 on postcard

## Heating Ovens

Various applications of radiant heating equipment for processing are shown in a brochure. It contains 18 case metal histories. (Fostoria Pressed Steel Corp.)

For free copy circle No. 35 on postcard

## Industrial Tires

Industrial tires are listed in a 36-page catalog. (B. F. Goodrich Tire Co.)

For free copy circle No. 36 on postcard

## Air Chucks

Air operated chucks, cylinders and accessories are extensively covered in a 75-page catalog. (The Cushman Chuck Co.)

For free copy circle No. 37 on postcard

## Wire Rope

Wire rope of a new type is analyzed in a 4-page folder. This wire rope, it states, not only transmits force but it also transmits electrical energy for fast, safe, economical communications work. The wire rope contains copper wire conduc-

tors imbedded in a fiber center, which is "laid-up" in a regular steel wire rope. (American Chain & Cable Co., Inc.)

For free copy circle No. 38 on postcard

## Check Valves

Check valves are covered in a brochure. It discusses their service in general use, for corrosive service and low pressure service. The brochure also deals with relief valves, shut-off valves and shuttle valves. (James, Pond & Clark, Inc.)

For free copy circle No. 39 on postcard

## Screws, Plugs, Pins

A 32-page catalog reviews an extensive line of standard socket screw products, pressure plugs and dowel pins. Major products listed are heat-treated alloy steel and stainless steel socket-head cap and set screws. (Standard Pressed Steel Co.)

For free copy circle No. 40 on postcard

## Motor Starters

Motor starters and contactors are described in a 12-page bulletin. These units come in sizes 4, 5 and 6 (Type 425), 50 to 400 hp. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 41 on postcard

## Conveyors

Steel platen conveyors are detailed in a folder. These adapt to materials handling, automatic assembling, inspecting or light machining operations. (Visi-trol Engineering Co.)

For free copy circle No. 42 on postcard

## Job Shop

Service and facilities of a large job shop are described in a 12-page brochure. Shown is a modern plant and examples of work: precision parts, welded aluminum components, experimental sheet metal stampings. An impressive list of customers in the automotive and aircraft fields appears. (Automotive Fabricators, Inc.)

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## How to move a mountain of coal—economically

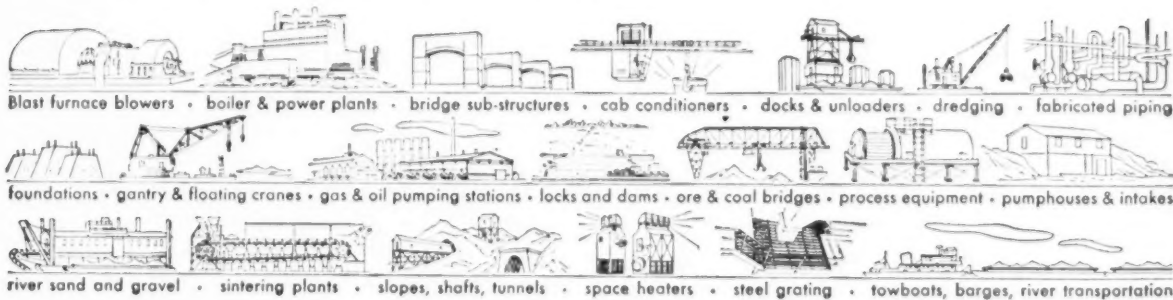
Coal is essential to steel production. Every day huge quantities of it are converted into coke for use in blast furnaces. Maintaining adequate supplies is a big transportation job, where small savings on every ton multiply into impressive totals.

Designed especially for this type of work, modern river towboats and large-capacity barge fleets provide low cost freight service over the inland waterways system. Vessels like Island Creek Fuel and Transportation Company's *Raymond E. Salvati*, above, deliver up to

18,000 tons of coal per trip. Such Dravo-built towboats are products of many years of research, studies in actual service and scientific model basin testing. Engineered for low operating costs, they produce benefits for consumer *and* transporter.

Experience in constructing more than 3,700 hulls enables Dravo to build this kind of performance into many types of floating equipment. For more information on any of the products and services listed below, write to DRAVO CORPORATION, PITTSBURGH 25, PA.

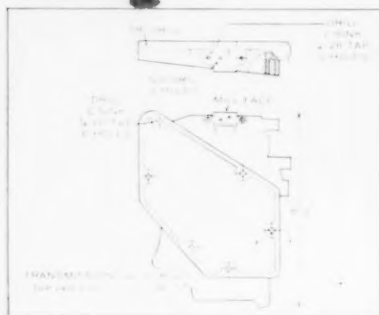
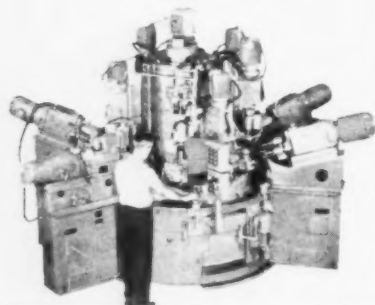
**DRAVO**  
CORPORATION



- drills
- c'sinks
- taps
- mills



**460 PER HOUR GROSS**



Milling is at high speed—7200 rpm. Five vertical units on the center column operate on the holes in the milled face. Three angular units operate on the six mounting holes. The machine has a 60-inch index table with eight stations.

A Kingsbury indexing automatic is the best way to perform drilling types of operations—

- at a high production rate.
- at low unit cost.
- with unvarying accuracy.

Kingsbury Machine Tool Corporation, Keene, New Hampshire.

**KINGSBURY**

INDEXING AUTOMATICS for high production drilling and tapping

## TECHNICAL BRIEFS

# Better Handling Cuts Heat Treat Rejects

Improving materials handling systems can, of course, boost production. This is usually done by speeding work from station to station.

But it can up output another way—by cutting down rejects. An efficient setup can keep product damage at a minimum.

Putting high strength, alloy steel pallets into action at a large foil producer's plant wiped out a problem so critical that it once seriously reduced foil yield. The pallets countered a high temperature warpage situation in the company's annealing operations.

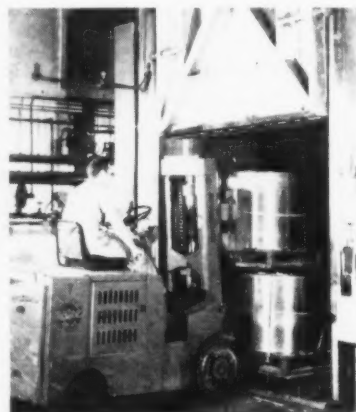
In handling coils of aluminum foil, Cochran Foil Co., Louisville, ran into some troubles. After fork trucks deposited pallet loads of aluminum coils in annealing furnaces, the pallets would warp from the furnace heat.

**Double Trouble**—However, the short life span of the pallets wasn't the firm's major worry. While ordinarily strong and tough enough for any type materials handling problem, the metal pallets warped so badly upon prolonged heat exposure that the edges of some of the 3000-lb aluminum coils were badly damaged. Over a period of time, this led to a considerable reduction in foil yield.

Heat deformed pallets, with irregular slats or ribs, also limited the height to which palletized coils could be safely stacked. This also increased space required to store the coils. Needless to say, all this did not make plant engineers happy. So they called on pallet de-

signers at the Pressed Steel Div. of Republic Steel Corp.

**New Design, Strong Alloy**—Designers came up with this answer to the situation: corrugated pallets of high strength alloy steel. These outlast the previous units by five to one. After two years in use, no sign of warpage is evident in 750 of the new pallets. This is despite the fact that each is periodically



**Thanks to new pallets, these coils come out undamaged.**

subject to 960°F temperature for 12-hour cycles in annealing furnaces while bearing 6000 lb of aluminum coils.

The damage problem is now nil; the storage worries no longer exist.

## Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

either. Fork lifts now stack the high strength units four high; each bearing two aluminum coils weighing 3000 lb apiece.

**What They Are**—The new pallets are 36-in. wide x 72-in. long, corrugated and formed in a lattice-work pattern. The latter permits free circulation of air while in the annealing furnace. Re-enforcing corrugated "stringers" are specially located to provide efficient distribution of coil weight.

While the physical design is important, most of the credit for withstanding the heat goes to what they're made of. This is a high strength, alloy steel known as Republic-50. This metal has a 50,000-psi minimum yield point and a 70,000-psi minimum tensile strength. Its developers say the combination of alloy materials in the steel and the method of heat treating it provides it with the strength to resist prolonged high-temperatures.

## Machines Shear Dirt From Cast Parts

Cleaning large cast iron parts by hand is slow and costly. So one company employing hand methods to clean its painted cast iron lathe beds decided to find a better way.

The concern had this problem: Its lathe beds are big—the smallest is 40-in. long x 24-in. wide x 30-in. high. Some beds range to 18-ft long x 5-ft wide x 7-ft high.

**Coats Prevent Rust**—The large castings come from the foundry with a coat of gray primer on the outside and a white primed coat on the interiors. This is to protect them from rusting pending machining.

Machining setups include: facing, grinding of ways, drilling and planing. These operations leave recesses and cavities filled with chips, grinding dirt, oils, grease, fingerprints and other shop dirt. Getting rid of these once was quite a job. Hand cleaning seemed to be the only way.

**Machines Do It Now**—Now, the firm has switched to cleaning ma-



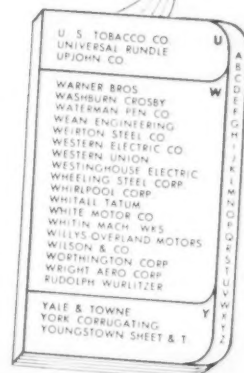
Logan Roller Conveyor system speeds packing and shipping operations for leading producer of aluminum. Transfer cars connect storage lines in bays at right to main line at left. Weighing in transit is accomplished with scale sections.

**The  
LEADERS  
use  
Logan**

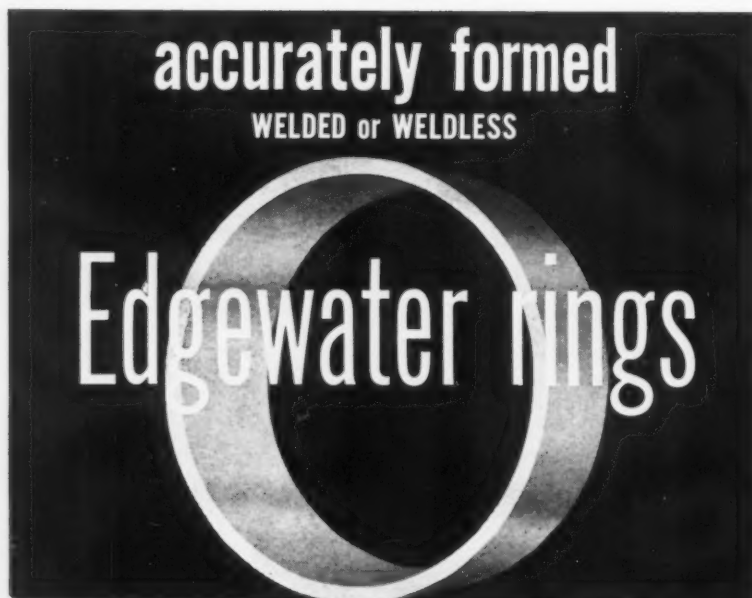


The mark of a leader is—"ability to deliver the goods." In more ways than one, Logan Conveyors aid the nation's leading industries to do just that. Logan equipment makes important intra-plant deliveries, linking up all production operations into one efficient whole. And these conveyors, built to convenient working heights, save bending, lifting and straining, too. Remember you get value-plus, that something-added when you specify Logan-engineered conveying equipment. Write today to—

LOGAN CO., 545 CABEL ST., LOUISVILLE 6, KENTUCKY



**Logan Conveyors**



save critical materials . . .

reduce costly machining . . .

meet highest quality standards

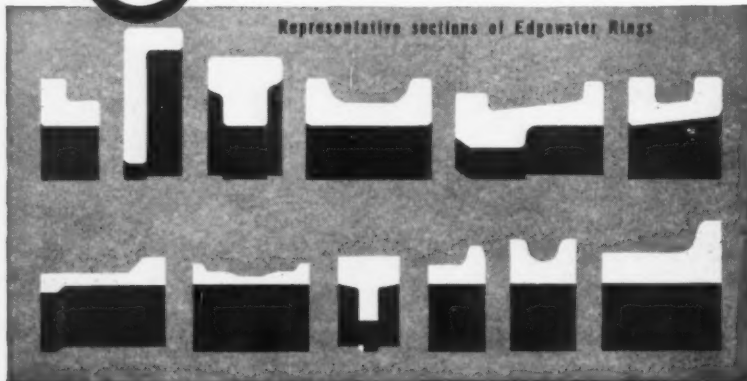
Your most critical specifications can be met by Edgewater Steel Rings—welded or weldless as required by the service. Formed accurately by modern methods, they are close to finish size as rolled. Weldless rings are rolled from solid steel blocks, in diameters from 5 to 145 inches. Welded rings up to 48 inches in diameter are formed from bars extruded or rolled to shape. Both types can be made in a great variety of sizes and cross-section shapes, as shown below. Being accurate in size and cross-section, Edgewater Rings save costly material and machining time.



**Edgewater Steel Company**

P. O. Box 478 • Pittsburgh 30, Penna.

Representative sections of Edgewater Rings



## TECHNICAL BRIEFS

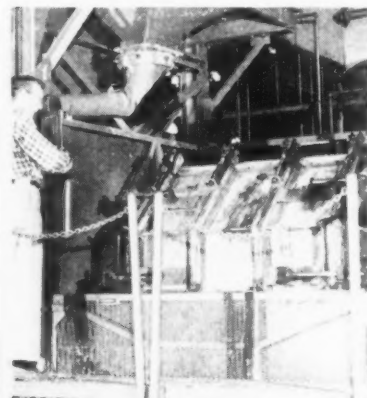
chines made by the Magnus Chemical Co., Garwood, N. J. These heavy-duty, dip, immersion, agitating units handle loads to 20 tons. They agitate the work up and down through a cleaning solution causing a scrubbing action. This actually shears the dirt from the metal surfaces, grooves, recesses and holes. It leaves these dirt-free.

Instead of the 2½ to 3 hours previously needed, the machines clean the lathe components in minutes. The company has completely eliminated pre-washing and hand scrubbing. One washing unit now does the work of a spray washing machine, a steam gun, a vacuum cleaner, a dip tank and three men.

### Tumbling Big Parts Speeds Finishing

To speed production of complex stainless steel components, a firm is using specially built tumbling machines. These big units smooth the edges of large precision assemblies for jet engines.

Using the new automatic machines, Solar Aircraft Co., San



**This big tumbler hones edges of large precision assemblies.**

Diego, Calif., completes its finishing operations in one-quarter of the time previously required.

**Hold 14 Assemblies**—The new tumbling machines have a drum about 6-ft long and 4-ft in diam.



A central shaft in the machine holds up to 14 of the assemblies.

In use, the parts are held rigidly on the central shaft, while the large tumbling barrel slowly rotates. The barrel contains an abrasive charge—a mixture of aluminum oxide chips, pieces of mild steel wire, and water. As the barrel revolves, the abrasive mixture hones and polishes the sharp edges and nicks.

The units finished are intricate assemblies, consisting of inner and outer shroud rings connected by as many as 160 air foil vanes.

**The Old Way**—Before the company obtained the tumbling units, the assemblies were deburred using hand air grinders, automatic vapor blast units, and automatic wash cabinets.

Often, inspection after previous operations revealed remaining nicks or sharp edges. These required additional honing and polishing. One hour or more was needed for the finishing cycle.

**Eliminate Hand Deburring**—The tumblers completely eliminate hand deburring, vapor blast and wash operations, and are 75 pct faster. Other advantages are less possibility of damage to the precise jet components; better mating of parts in the completed engines; better balance; and increased life of the components.

The tumbling machines were built by Almco Div. of Queen Stove Works, Inc.

## Paper Wipes Clean

Disposable paper wipers can get jobs done faster. So reports Allan Wood Steel Co., Conshohocken, Pa., which now uses them in its mill repair shops.

Jobs just do not take as long when workers use a clean wiper for every application. This is because there are no chips sticking in the wipers to injure hands. So employees just brush off shavings and oil quickly with no search for sharp hidden pieces of metal.

Moreover, workers don't have to hike from one end of the shop to

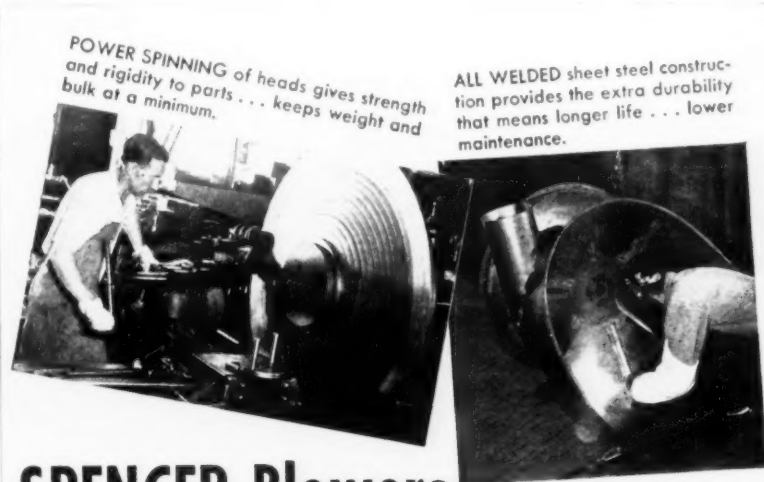
the other to get new wiping rags or material. Instead each has a box of clean wipers at each machine.

**Sop Up Oil**—Made by Scott Paper Co., Chester, Pa., the wipers are durable, absorbent and efficient for cleaning up oils, moisture or greasy deposits. Since workers throw them away after use, there's no greasy cloths or waste laying around the shop to become health or fire hazards.

## Slits Thin Strip

Stainless steel strip is being slit to a gage of 0.040-in. in production operations. This is being done to a tolerance of  $\pm 0.001$ -in. with no significant burrs resulting.

Ulbrich Stainless Steels, Wallingford, Conn., is producing annealed or tempered stainless strip in the 0.040-in. size for general customer distribution.



## SPENCER Blowers

*perform better because they're made better*

Operation of any blower can only be as good as the workmanship that goes into making it.

That's why, step by step in the manufacture of SPENCER blowers—from the careful rolling of sheet steel to form casings... to the final painting with lead-base paint and then enamel—no effort is spared to produce the most reliable, sturdily constructed blowers on the market.

Spencer recognizes that there are no short cuts to quality. That's why SPENCER blowers have been preferred for forty years by leading furnace and other equipment manufacturers.

SPENCER  
Blowers are  
available in  
these capacities:

H.P.—1/3 to 1,000  
CFM—Up to 20,000  
Pressure—4 oz. to  
10 lbs.



Request Catalog 126-A containing complete specifications.



OTHER QUALITY  
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STATIONARY  
VACUUM  
SYSTEMS



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PNEUMATIC  
CONVEYING  
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## for all types of HYDRAULIC EQUIPMENT

Hyde Park Rams are available in Chilled or Alloy Iron.

Furnished in hardness range to meet your specification ... ground to your required size.

On your next replacement of Rams — or for new equipment—consult us. Our engineers will be glad to assist you.

**Red Circle Rolls for every Purpose**

**Rolling Mill Equipment**

**Gray Iron Castings up to 80,000 lb.**



# Hyde Park

**FOUNDRY & MACHINE CO.**

Hyde Park, Westmoreland Co., Pa.

**ROLLS**

**ROLLING MILL MACHINERY**

**GREY IRON CASTINGS**

## MATERIALS ROUNDUP

# Paint Resists Water, Severe Abrasion

Some plants are under almost continual bombardment by abrasive elements. Practically all outside buildings are subject to attack by wind, rain, dirt and/or sand.

The usual protective material for these structures is paint. The better the coating, the better the protection.

■ When the elements take their toll of an outside structure's paint job, they then begin wearing away the item itself. So maintenance men and

cane that reached a force of 140 mph. After the storm subsided, the newly painted exterior of a concrete block house showed almost no signs of wear. Six months later it still looks brand new.

Based on a vinyl acetate resin latex, the material was brush painted on the day before the storm warnings were posted, and when gusts of wind reached 45 mph. The paint applies easily by brush roller or spray and forms a well-knit film in a few hours. Therefore, it withstood the full force of the hurricane the following day. Subjected to a thorough blasting with sand, as well as driving wind and rain, the surfaces were unaffected, even though the coating was applied only a day earlier.

**Resists Water, Too**—Months after the test the coat still retains its gloss. There is no evidence of degradation, its testers report.

The material has light and heat stability, resistance to water, and freedom from graininess. Although it results in a dense uniform film, blistering is no problem. The resin has good moisture-vapor transmitting properties.

## Alloy Resists Heat

A new high strength alloy is for use where welded aluminum struc-

## Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.



**Months of sand blasting failed to injure this painted wall.**

painters get to work and paint it again. Each time a new coat goes on, it costs more money for materials and manpower.

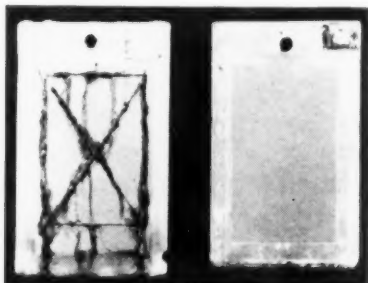
Here's how it adds up: The longer the coating provides adequate protection, the less it costs.

**Rugged New Paint**—One example of a long-lasting, rugged coating is a new development of Bakelite Co., a division of Union Carbide Corp., New York. This material underwent sand blasting by a hurri-

tures must operate at moderately elevated temperatures. Developed by the Aluminum Company of America, Pittsburgh, the alloy is expected to find applications where aluminum vessels, storage tanks and tubes must handle flowing and non-flowing materials at temperatures in the 150 to 300°F range. It's designated Alloy-X5454.

## Coating Resists Salt, Other Corrosives

Extreme resistance and corrosion is reported for a new two-coat paint. Its durability is matched with a bright, colorful appearance. Once baked on, this material resists weathering in saline and industrial atmospheres. It is recommended



These samples were exposed to a salt fog for 2640 hours.

for use as an exterior paint on air conditioning units and the like.

A monobake is used for the two-coats. Separate baking for the primer is optional, as is flocoat primer application where construction of the parts allows. The Arco Co., Cleveland, makes it.

## Electronics Lube

Featuring an exceptionally low electrical resistance, a new lubricant cleans metals and protects them from corrosion. Primarily produced for electronic equipment applications, the material's electrical resistance decreases with increases in temperature. Available from R. P. Scherer, Ltd., Windsor, Ont., the lubricant comes in capsules or in bulk. It can be employed with both mechanical and electronic setups.

make hardness tests  
**ANYWHERE**



with this lightweight,  
portable **NEWAGE** tester

Test any size, shape or type of metal anywhere! Use the versatile, 30 oz., portable, precision NEWAGE tester and eliminate the time, trouble and labor of getting work to a bench tester. Just press the hand grips and get answers in 30 seconds—inside or outside the plant, office or laboratory.

- no clamps, no jaws
- no calculations or conversions
- no restrictions to size, shape or type metal
- no skill required
- accuracy guaranteed by individual calibration available in scales corresponding to Rockwell and Brinell

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**PROMPT WAREHOUSE  
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*Most Complete Stock in  
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**BLUE TEMPERED  
SPRING STEEL**

*We believe that the way to sell is to  
carry a stock which permits satisfying  
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**CAMBRIDGE 40, MASS.**

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Phone: Grovehill 6-2600

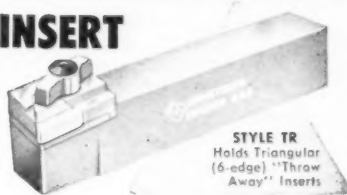


*New*

**ARMSTRONG**

*Armide* **CARBIDE INSERT  
TOOL HOLDERS**

**The advantages of  
Carbide Cutters with  
the Multiedged "throw away" ARMIDE inserts**



Write for  
Bulletin CIT

New ARMSTRONG Armide Carbide Insert Tool Holders hold multiedged, throw away Armide inserts. They end tool grinding and reduce down time. After an edge dulls, a slight turn of the clamping screw permits rapid indexing of the insert to a new cutting edge. Triangular inserts have 6 cutting edges; square inserts have 8 edges. They are available in three grades—Armide 350, 370, or 883.

ARMSTRONG Armide Carbide Insert Tool Holders are furnished either "Right Hand" or "Left Hand" in the two styles illustrated, each in 3 sizes.

**ARMSTRONG BROS. TOOL CO.**

"The Tool Holder People"

5209 W. ARMSTRONG AVE. • CHICAGO 30, ILL.



# New Production Ideas

## Equipment, Methods and Services



### Tubular Wire Electrodes Simplify Hardfacing

Hardfacing costs can be slashed by using tubular wire electrodes. So states a welding equipment maker which has just equipped its new welders with the electrodes. These tube wires, for use with the open-arc semi-automatic process, are said to make hardfacing easier and faster. Less operator fatigue is another benefit reported. Another key feature is the uniformity with which metal goes on, resulting in high quality welds. The electrodes

are 3/32-in. in diameter. Flux and hardfacing alloy, accurately proportioned for the proper weld deposit, are held compactly within the drawn steel tube. The company offers two types of tube wire: manganese wire coils, for manganese steel buildup and repair applications, and S/A 53 for hardfacing to resist both wear and impact. (American Manganese Steel Div., American Brake Shoe Co.)

For more data circle No. 45 on postcard, p. 113



### Fork Trucks Handle Heavy Loads Outdoors

Of 20,000-lb capacity, this outdoor fork truck has a 50-50 weight distribution which lets it navigate rough terrain with ease. Equipped with dual drive pneumatic tires, the truck features a planetary drive axle and 10.00 x 20-in. tires for driving power through mud, sand and bumpy ground. Continuous follow-up type hydraulic power steering operates throughout the engine speed range to permit fast, easy turning at any speed. A Hercules

six-cylinder gas engine powers the unit. Engine power is transmitted via a torque converter and four-speed power-shift transmission. Power brakes are standard. The unit travels at a 20-mph clip, forward or reverse. It climbs a 22.7-pct grade with a load. Its dimensions: 187 3/4-in. long; 96-in. wide; 176-in. outside turning radius. It features a 130-in. wheelbase. (Clark Equipment Co.)

For more data circle No. 46 on postcard, p. 113



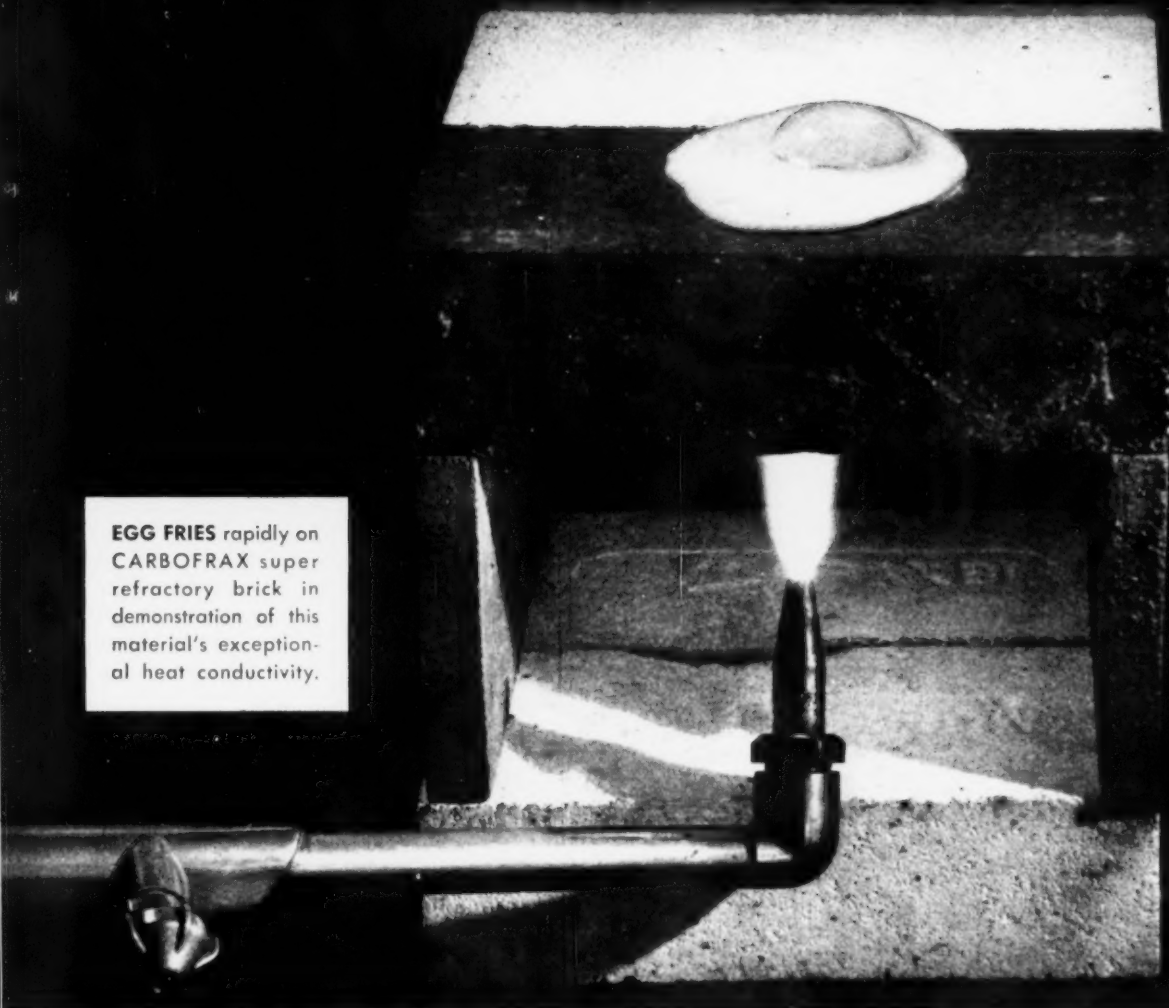
### Machine Tool Motor Starters Are Small in Size

This NEMA Size 0 and 1 magnetic motor starter is 42 pct smaller than previous open forms. Radically different in design, the starter is of "snap-slide" construction. Principal components simply snap or slide together for quick inspection and maintenance. Contacts can be inspected in seconds, without using tools. By turning a knob on each of the two overload relays, the overload trip setting can be adjusted up to +15 pct of nominal heater rating. This permits

quick adjustment to meet special application requirements such as in areas with varying temperatures. A new strongbox coil that requires a relatively low inrush current permits a reduction in mounting space for a control transformer. The improved coil makes possible the use of a 47-pct lower rated transformer than with the maker's previous starters. The motor starters come in several forms. (General Electric Co.)

For more data circle No. 47 on postcard, p. 113





**EGG FRIES** rapidly on CARBOFRAX super refractory brick in demonstration of this material's exceptional heat conductivity.

## Refractories for high heat conductivity

At 2200°F, CARBOFRAX® silicon carbide brick transmit 109 BTU/hr., sq. ft. and 1" F/in. of thickness. That is roughly 11 times the heat conductivity of fireclay and about 70% that of chrome-nickel steels. This conductivity becomes particularly valuable at the higher temperatures which these refractories alone can withstand (up to 3000°F without deformation; under certain conditions even higher). For example, there is increasing use of CARBOFRAX radiant tubes, muffles, retorts, and other structures which may operate at temperatures beyond the limitations of metals.

Seldom, however, are refractories called upon to provide heat conductivity alone. They must also be able to resist corrosion, spalling, cracking, heat shock and abrasion. Ability to carry heavy loads at high temperatures is another requirement often

encountered. These are but a few of the conditions successfully met by super refractories pioneered by Carborundum. Among them, you are almost certain to find answers to your refractory and high-temperature problems. For help, fill in and mail this coupon:

-----MAIL THIS COUPON TODAY-----

Refractories Division,

The Carborundum Company, Perth Amboy, N. J., Dept. 887

Please send me:

- ☐ Forthcoming issue of Refractories Magazine  
☐ Bulletin on Properties of Carborundum's Super Refractories  
☐ Here is a description of my high temperature problem. Can you help me?

Name \_\_\_\_\_ Title \_\_\_\_\_

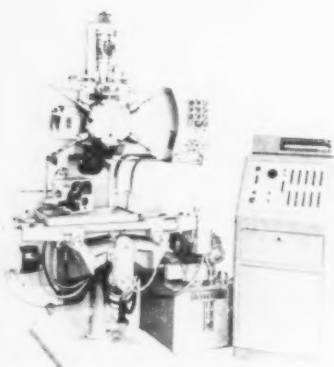
Company \_\_\_\_\_

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Registered Trade Mark

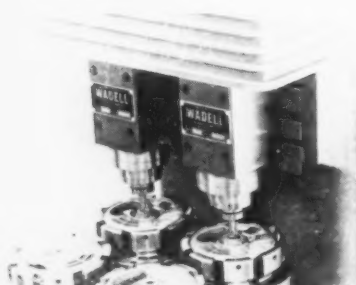


### Tape Controls Turret Drill's Index Table

One maker's multiple spindle turret drills can be teamed with a new automatic tape controlled positioning table. This results in a completely automatic setup for both prototype or production operations. Each spindle is controlled individually by the standard turret drill in speed, feed, and precision depth control, rapid approach and return. Selection of the six or eight (on different models) spindles and table

position is programmed on the tape. The unattended system then operates through a complex cycle of drilling, tapping, reaming, and boring. The two axis table includes: (1) a tape reader and command unit; (2) a comparison unit; (3) a servo control and table drive; (4) a digitizer; (5) a display, and (6) the positioning table. (Berg Tool Mfg. Co.)

For more data circle No. 48 on postcard, p. 113



### Automatic Vertical Borer Performs Precision Jobs

For precision work, this automatic vertical boring machine features an accurate positioning index table. The unit performs boring, turning, chamfering and other operations using multiple cutter heads. Its vertical design affords full use of two spindles, thus providing two

finished pieces per cycle. A typical job is the boring of electric motor end shields. Bore diameter is held to 0.0003 in. and concentricity within 0.001 in. Operation is automatic except for loading and unloading. (Wadell Equipment Co.)

For more data circle No. 49 on postcard, p. 113

**Now..hinged-steel FLAT-TOP**

## Magnet Leech Speeds Magnetic Particle Tests

This permanent-magnet leech enables one man to perform magnetic particle inspection operations that formerly required two men. The leech consists of a permanent alnico magnet, cast pole pieces with an aluminum carrying handle, and 5 ft at 2/0 cable. It will remain and make electrical contact as long as desired on any magnetic surface, including vertical and overhead members. The magnetizing source may be ac, or half-

wave current, not exceeding 1500 amp. An older method of dry powder testing requires two men. One man positions a prod while another applies powder and operates a second prod. The new method frees one inspector for other duties. It's easy for a single inspector to apply powder, once the leeches (or one leech and one prod) are set in position. (Magnaflux Corp.)

For more data circle No. 50 on postcard, p. 113

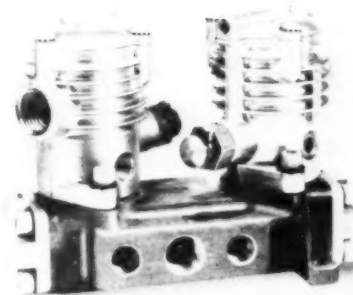


## Control Valves Are Compact, Very Fast

Designed for control of small devices, new 1/4-in. four-way foot-mounted control valves are compact and extremely fast. They come in both single and double solenoid types. The valves feature aluminum bodies, end caps, spacers and piston, hard chrome plated stainless steel stem. Fabreeca-backed stainless steel shock pads and standard O-ring packers. Solenoid pilots, inter-

changeable between single and double solenoid types, also interchange with all of the maker's standard valves. Encased in molded epoxy resin, solenoid coils are guaranteed against burn-out for the life of the valve. Pilots are built to JIC standards. Pilot plungers and valve stem are the only moving parts. (Valvair Corp.)

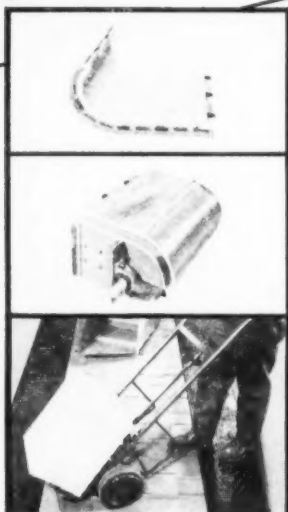
For more data circle No. 51 on postcard, p. 113



another **FIRST**  
by May-Fran

# conveyor belting!

**MOVING "SIDEWALK"**  
**WILL HANDLE**  
**WIDE RANGE**  
**OF MATERIALS**



May-Fran proudly announces a new concept in materials handling . . . the May-Fran FLAT-TOP steel conveyor belt. Precision-forged steel plates interlock snugly to form a rugged, flat-surfaced conveyor belt ideal for assembling appliances, automobiles and other types of heavy products or for handling hot, heavy or rough materials. Special May-Fran link design forges the entire belt into a rugged, integral unit capable of negotiating either concave or convex curves—yet permits rapid assembly or disassembly.

Designed especially for flush-with-floor as well as extended surface mountings involving heavy-duty operations, the FLAT-TOP steel conveyor has no stationary or moving parts above the surface of the belt. In floor mounted applications, there

are no aisle obstructions to disrupt normal plant traffic . . . employees and mobile equipment can safely cross the FLAT-TOP belt while it is moving. This special flat-deck design also permits the handling of materials that extend beyond the width of the belt.

The May-Fran FLAT-TOP is specifically engineered to provide all the advantages of old-fashioned slat-type belting while eliminating the disadvantages and safety hazards common to slat conveyors. Tightly meshed belt links prevent tools and small assembly parts from falling through the belt.

Write and tell us about your materials handling problem. May-Fran engineers will be happy to tailor a FLAT-TOP steel conveyor belt to your requirements.

**MAY-FRAN**  
**ENGINEERING, INC.**

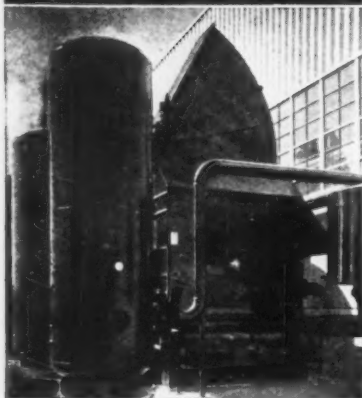
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For further details  
ask for special  
FLAT-TOP bulletin.



7583-MF

## HOW YOU SAVE...



### ... getting drier Compressed Air

Direct saving in the cost of cooling water saves the price of the Niagara Aero After Cooler (for compressed air or gas) in less than two years.

Extra, for no cost, the drier air gives you a better operation and lower costs in the use of all air-operated tools and machines, paint spraying, sand blasting or moisture-free air cleaning. Water saving also means less expense for piping, pumping, water treatment and water disposal, or you get the use of water elsewhere in your plant where it may be badly needed.

Niagara Aero After Cooler assures all these benefits because it cools compressed air or gas below the temperature of the surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air thru a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter by the Niagara Balanced Wet Bulb Control.

Write for Bulletin No. 130.  
Address Dept. 1A-8-1

#### NIAGARA BLOWER COMPANY

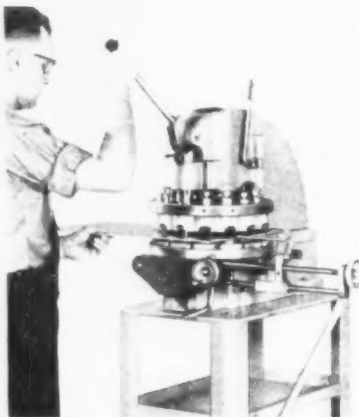
405 Lexington Ave., New York 17, N.Y.

District Engineers  
in Principal Cities of U.S. and Canada

## NEW EQUIPMENT

### Turret Punch

Featuring micrometer gaging, this 12-station hand-operated turret punch performs burr-free punching. It pierces from 1/16 to 2-in. holes in sheet metal. Recommended for short runs or model shop use, the press employs micrometer type back and side gages. These set at any point from maximum adjust-



ment to the center of the smallest punch in 60 seconds. Because clearance as small as 0.002-in. is possible on the punches, holes can be punched in thin sheet material without distortion or burrs. A wide selection of round, square, oval, rectangular and notching punches and dies is available for use with the unit. (O'Neil-Irwin Mfg. Co.)

For more data circle No. 52 on postcard, p. 113

### Milling Machine

Flexible and rugged; that describes a new double-column hydraulic production milling machine. This miller operates with two or more milling or grinding heads positioned as required. Inherent in the unit is its table rigidity. This results from the double-column mount. The heavy, internally braced column castings have extra wide bearing surfaces. Dovetails are deep and hand-scraped. The unit has a 30-in. maximum table stroke, adjusted by movable dogs. (U. S. Burke Machine Tool Div.)

For more data circle No. 53 on postcard, p. 113

### Testing Machine

A belt-over-the-part static-dynamic balancing machine works with parts of up to 100 lb. Principal new features of the machine include a high speed belt drive. This rotates the part within the balancing machine bearings. Both the angle and amount of unbalance show on two electrical meters mounted in the control cabinet. It eliminates operator guesswork. A switch in the control cabinet permits the operator to change the plane of correction instantly. (Tinius Olsen Testing Machine Co.)

For more data circle No. 54 on postcard, p. 113

### Refractory Gun

Nozzle controls on a new refractory gun permit one-man operation of material, air and water flow. The gun comes in four sizes to fit the needs of all cupola and electric furnace operations. Their available material capacities are: 1700, 3000, 4300 and 5600 lb. Other units can be made to order. The one-man guns handle most granular cement-like materials from 30 to 160 lb bulk density. (Ridley & Co.)

For more data circle No. 55 on postcard, p. 113

### Potentiometer

This recording potentiometer features two pens both writing margin to margin on a single 5-in. strip

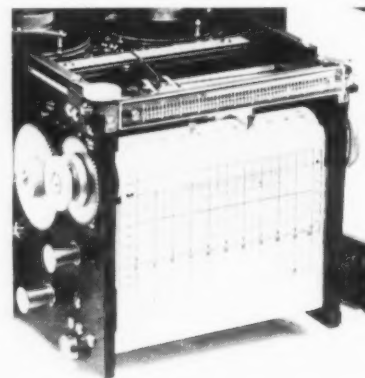


chart. It produces two continuous records in a smaller space than previously required for two 3-in. recorders. The recorder is available with one front set limit switch and three back set limit switches on



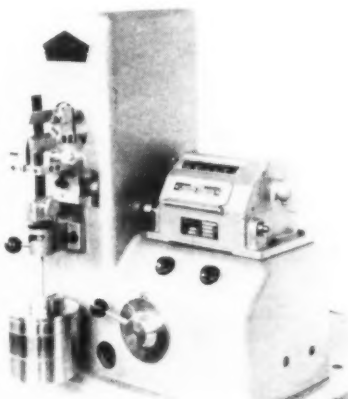
each pen. Its amplifiers are completely transistorized. The instrument features such specifications as 0.5 pct accuracy on each pen, sensitivity 0.14 pct of scale span, maximum source impedance of 1000 ohm per mv of span, mv or TC calibration. The case extends only 13 in. behind the panel face. Westronics, Inc.)

For more data circle No. 56 on postcard, p. 113

## Fatigue Tester

This testing machine determines the durability of sheet, foil, etc. The apparatus has an infinitely variable motor; this lets it adjust fatigue numbers from 110 to 1000 per min. Adjustment is made on a scale arranged at the front of the housing. Here's how it works: The specimen is bent to-and-fro repeatedly at an angle adjustable from 0 to 90°. The part carrying the machined bending edges is immovable, whereas the upper clamp moves. To adjust the bending edges so that they are situated in the

bending axis, two micrometers are provided. At the same time, these micrometers serve for fixing the bending point. Vertical displacement of the part carrying the bending edges is controlled by a vernier.



A preliminary load is applied by a weight support. Test loads from 100 to 5000 g. may be selected. At break of test specimen the weight support falls down, thereby switching off the apparatus. (Karl Frank GmbH.)

For more data circle No. 57 on postcard, p. 113

## Oil, Gas Valves

Three new lines of steel gate valves have been introduced for gas and oil service. They include: (1) a single-disk, conduit type pipeline valve; (2) a double-disk, parallel seat pipeline valve, and (3) a smaller gate valve for general services. Both new pipeline valve designs are suitable for service with crude oil, refined petroleum products, and gas, at atmospheric temperatures. (Crane Co.)

For more data circle No. 58 on postcard, p. 113

## Openhearth Feeder

If you're tired of hand methods of feeding ferromanganese into openhearth furnace ladles, maybe you'll like this: a mechanical ladle feeder. The new unit promises to make ferromanganese additions to steel a little easier. By using the mechanical feeder, steelmakers can feed controlled amounts of ferromanganese to the ladle. This eliminates the need, where hand methods are employed, of making

## STRENGTH and ECONOMY ASSURED THROUGH FLAT-DIE FORGINGS!



Typical examples of flat die forgings.

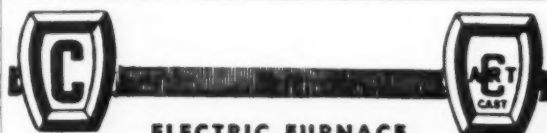
Combining the time-proved advantages of forged strength, minimum stock allowance and versatility in materials selection, flat die forgings mean real savings and satisfaction — for experimental parts or short run production.

For prompt service, or our technical "know how," call or write:

**COMPOSITE  FORGINGS, Inc.**

2300 W. JEFFERSON, DETROIT 16, MICH.

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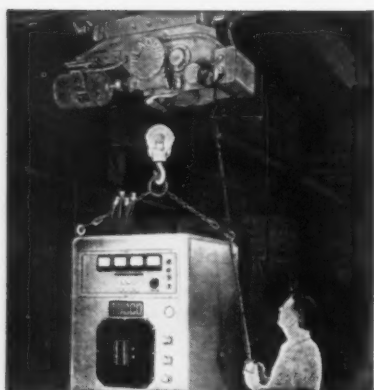
## ELECTRIC FURNACE STEEL CASTINGS

**CARBON • ALLOY • STAINLESS  
SAND OR SHELL MOLDED**

"C" Steel Castings—sand or shell molded—possess qualities far more interesting than the mere strength of steel. For, in addition to strength they provide more efficient design—better weight-strength ratio—and greater fatigue resistance, i.e., longer life and less replacement. Furthermore "C" Steel Castings, because they are truly foundry engineered from pattern to final casting, require minimum machining and provide better fit plus fast assembly.

If you are interested in castings, the know-how, experience and engineering knowledge of our staff are at your service upon request.

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LANSLOWNE 1, PENNA.



**Push a button  
for higher production with  
READING ELECTRIC HOISTS**

● Ohio Crankshaft's Tocco Division plant is meeting higher production goals with help from Reading Electric Hoists. The new plant was designed with a Reading Hoist "custom-built" into the plans. Write for our latest bulletin "The Why and How of Faster Production".

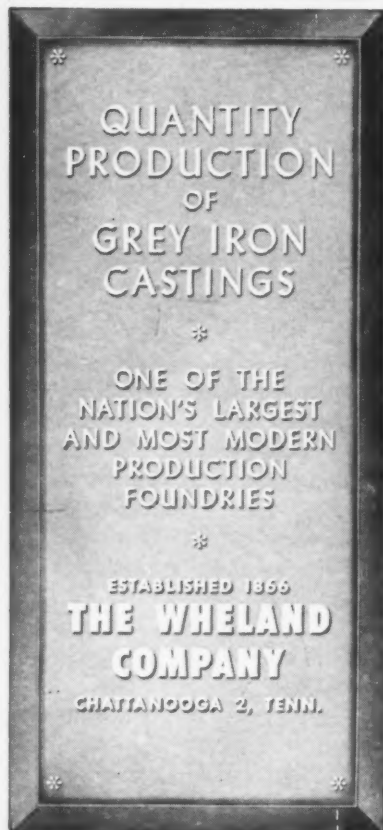
**READING CRANE  
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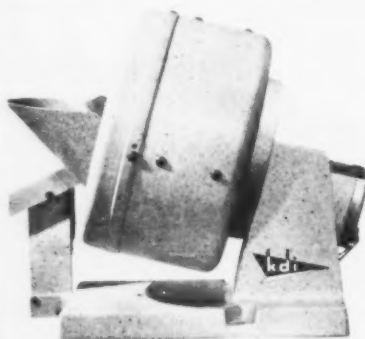
## NEW EQUIPMENT

additions of ore to the furnace melt. Old methods sometimes resulted in 25 pct of the ferromanganese being lost to the slag. (Blaw-Knox Co.)

For more data circle No. 59 on postcard, p. 113

## Hopper Feeder

This special drum hopper is made for high-rate orienting and feeding of small parts. It quickly and easily tools-up for feeding headed fasteners, nuts, rivets, wire terminals, light electrical components, and other small metal parts at rates up to 150 pieces per min-



ute. A rugged cast aluminum base acts as a mounting plate, supporting the 10-in. diam steel drum having a 100 cu in. working capacity. Mounted on a double row ball-bearing drive shaft that is lubricated for life, the drum is driven through enclosed spur gears by a high torque Barber Colman gear head motor. (KDI Corp.)

For more data circle No. 60 on postcard, p. 113

## End Mills

End mills specially designed for working aluminum and other non-ferrous materials now come in

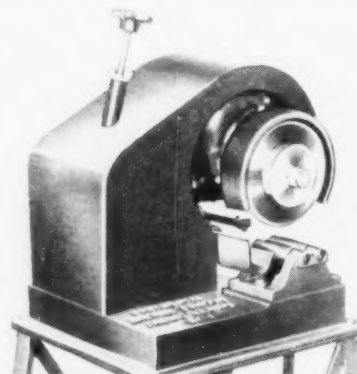


standard sizes. These high speed end mills include regular and long length tools in 1/4 to 2-in. diams. (Whitman & Barnes.)

For more data circle No. 61 on postcard, p. 113

## Pipe Cutoff Unit

As many as 2000 pieces of pipe or tube per hour can be cut off by this machine. The air-operated rotary cutoff unit handles 3/8 to



1 1/4-in. tube and pipe. It takes light gage materials to 16-gage wall thicknesses. Simple operation is a key feature. (Continental Machine Co.)

For more data circle No. 62 on postcard, p. 113

## Lens Anti-fogger

Combining cleaning and anti-fogging properties is a new material. The lens cleaning fluid is said to keep both plastic and glass surfaces fog-free for long periods. It sprays on a lens and can be wiped with either a cloth or goggle cleaning tissue. Though it keeps lenses defogged under extreme conditions, the cleaner is nontoxic and non-inflammable. (American Optical Co.)

For more data circle No. 63 on postcard, p. 113

## Furnace

With a gross heating rate of 1200 lb per hour to 1500°F a new batch-type, controlled atmosphere, heat-treat furnace has a temperature range of 1450 to 1700°F. It has a wide process range including carburizing, carbonitriding, carbon restoration and clean hardening. The unit features a sealed and pressurized vestibule, large quench tank, and a safety door mounted inside the vestibule. A full furnace load of four 14 x 22 x 18-in. work containers can be batch processed and quenched at one time. (Dow Furnace Co.)

For more data circle No. 64 on postcard, p. 113

To improve your product



## AN EXAMPLE OF ALCHEMY

**Transmutation of machine chips (background to foreground) from base steel to pure profit**

The chips in the foreground aren't really gold — but they are the next best thing if you do extensive machining on circular forgings. They're Hi-Qua-Led Steel<sup>®</sup>. They are also the same grade steel as the chips in the background — 4140. You can see the great difference, but let us tell you something about it, too.

An initial production run in a customer's plant — using a Fellows gear shaper — produced both sets of chips. The regular 4140 steel forging had a Bhn of 285; the 41L40 Hi-Qua-Led Steel forging in the same grade had a Bhn of 285 to 293. Here are the results:

	4140 Steel	41L40 Hi-Qua-Led Steel
Roughing cut	50-60 sfm	80-85 sfm
	0.0145 feed	0.0176 feed
	0.530 depth of cut	0.533-0.538 depth of cut
Finish cut	50-60 sfm	100 sfm
	0.0145 feed	0.0176 feed
	0.033 depth of cut	0.025-0.030 depth of cut
State of finish	regular	super-finished
Total machining time	3½ hr average per gear (excluding down time for tool breakage)	2 hr average per gear (no tool breakage)

**Machining time saved:** 1½ hours or 43 per cent per gear. The savings shown in this particular test are typical of Hi-Qua-Led's performance in many applications. Further, when you use Hi-Qua-Led circular forgings you do not sacrifice any regular steel quality. Hi-Qua-Led in any AISI grade has the same attributes as regular steel of the same grade.

Investigate the possibilities of Hi-Qua-Led Steel in circular forgings from 18- to 145-in. OD. ALCO specialists will visit your plant to help you save the most from its machining potentials. Contact your nearest ALCO sales office, or write Spring & Forge Division, Dept. OCF-3, P. O. Box 10665, Schenectady 1, N. Y. for brochures.

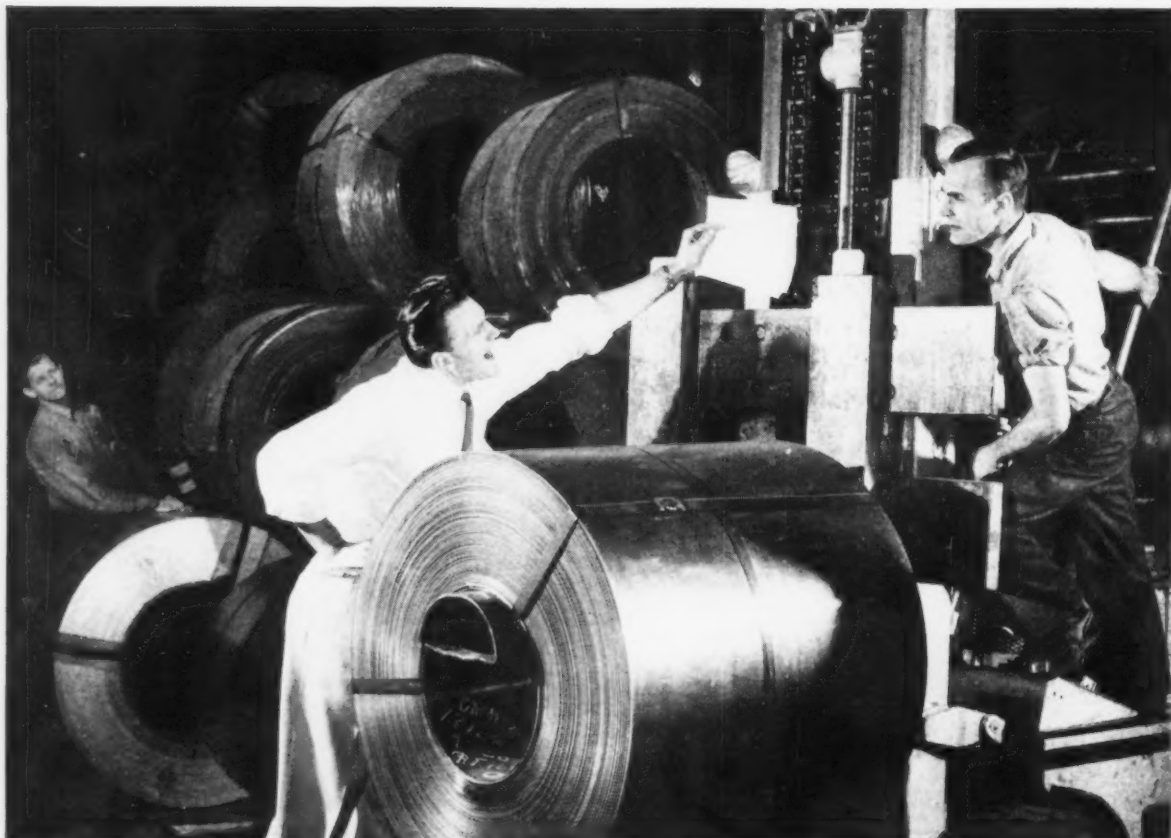


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Locomotives • Diesel Engines • Nuclear Reactors • Springs • Steel Pipe • Forgings • Oil-Field Equipment



*“Here’s a hot one for the slitters*

## **60,000 lbs. of slit coils ... delivered early tomorrow!”**

**A TRUE STORY of Ryerson service—the kind that makes Ryerson your best source for every steel requirement.**

It was ten after five. The phone rang and a steel buyer 80 miles away said: “I’ve simply got to have 60,000 lbs. of slit coils first thing in the morning.”

Impossible?

Not at Ryerson. This kind of service is what Ryerson customers have learned to count on when emergencies arise.

The needed steel was on hand in Ryerson stocks. Unequalled slitting equipment was put to work. And during the night two different gauges of steel

coils were slit to meet two size requirements. Early next morning the steel was delivered *as promised* ... 80 miles away.

You don’t have to wait for an emergency to appreciate Ryerson service. Our stocks and processing facilities enable us to meet practically every demand for steel—no matter what the shape, size, quantity or time requirement.

In addition, you can always depend on Ryerson for steel of high uniform quality.

So call your nearby Ryerson plant for steel or help on steel problems with the assurance of close personal attention by specialists who make your problems their own.

*In stock: Carbon, alloy and stainless steel—bars, structural, plates, sheet and strip, tubing, re-bars—industrial plastics, machinery & tools, etc.*



# **RYERSON STEEL**

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI  
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# The Iron Age Summary

## Steel Takes Turn For The Better

**Incoming orders are picking up. Automotive shows signs of life. Buyers fret over steel inventories.**

**Mill optimism grows. They're trimming sails for upturn in sheets. Go easy on light plate orders.**

■ It looks as though the steel market has finally turned the corner for the better. Incoming orders are picking up. This includes some automotive business, although Detroit has not as yet jumped in with both feet. The overall order picture so far is not overwhelming, but the trend is there.

As the market outlook improves, steel users are taking a closer look at their inventories. Many steel customers are keeping in close touch with steel salesmen as a hedge against being caught short. Some of the automotive business is to plug holes on inventory shortage items.

**Mill Optimism** — The mills themselves are more optimistic. One large producer looks for third quarter operations at 93 to 95 pct of capacity for his mills. He believes full capacity operations might be reached during fourth quarter.

When automotive catches fire, it will tighten the market in sheets, principally. But other items that to date have been slow also will pick up. These include wire for seat springs and other uses, terne plate for gas tanks, bars for miscellaneous parts, strip for trim and other applications.

**Plate Outlook**—The mills already have begun to trim their sails for the expected upturn in sheet demand. They are going slow on orders for light plate to be rolled on sheet-strip mills. This means that light plate users will have to turn to the regular plate mills for more of their requirements. Heavy plate users also will be affected to the extent that light plate tonnages are shifted from the sheet-strip mills.

Paradoxically, steel scrap prices eased off again this week. But there's nothing in the wind to indicate that prices will falter much more, if at all.

**British Prices Rise** — Scrap dealers and brokers are aware that the steel market will show a slow but steady improvement during the balance of this year. They're aware, too, that steel production for the year may well exceed the record of 117 million ingot tons produced in 1955.

While Senate probers get set to quiz American mills on their pricing policies, steel prices in Great Britain went up an average of 7 pct on July 29. This is nearly double the percentage rise in American steel prices. British producers said the higher prices were needed to cover increased material and transport costs. They added that they need more money to expand capacity from earnings. British iron and steel scrap prices were boosted \$2.50 a ton.

### Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,125	2,035	2,010	443
<b>Ingot Index</b>				
(1947-1949=100)	132.3	125.7	125.2	27.5
<b>Operating Rates</b>				
Chicago	83.0	80.0*	84.0	6.0
Pittsburgh	84.0	82.0*	85.0	8.0
Philadelphia	92.0	83.0*	99.0	0.0
Valley	75.5	73.0	61.0	13.0
West	105.0	102.0	102.0	24.0
Buffalo	90.0	90.0	89.0	0.0
Cleveland	77.5	76.0*	80.0	0.0
Detroit	88.0	85.0*	98.0	51.0
S. Ohio River	69.0	64.0*	76.0	73.0
South	85.0	87.5	93.0	3.5
Upper Ohio R.	73.5	72.0*	73.5	55.0
St. Louis	87.0	79.0	80.0	103.0
Northeast	34.0	37.0*	66.5	48.0
<b>Aggregate</b>	83.0	79.5	78.5	18.0

\*Revised

### Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
<b>Composite price</b>				
Finished Steel, base	5.967	5.967	5.670	5.179
Pig Iron (Gross ton)	\$66.15	\$66.15	\$64.56	\$61.36
Scrap, No. 1 hvy (Gross ton)	\$53.50	\$53.83	\$54.50	\$52.67
<b>Nonferrous</b>				
Aluminum ingot	27.10	27.10	27.10	25.90
Copper, electrolytic	29.25	29.25	29.25	46.00
Lead, St. Louis	13.80	13.80	13.80	15.80
Magnesium ingot	36.00	36.00	36.00	34.50
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	96.75	95.875*	97.375	100.25
Zinc, E. St. Louis	10.00	10.00	10.50	13.50

# Furnaces Are Buyer's Market

**With sales showing slight downturn, the industrial furnace field is getting more competitive.**

**However, some price boosts are likely to follow the recent steel price advance.**

Buyers of industrial furnaces and ovens will find the market competitive, with deliveries good, and the prospect of some price increases likely.

Equipment builders, seeking orders while sales are running about 7 pct below last year's, are highly responsive to customer wants. Most feel, however, that recent advances in steel prices are going to be reflected in furnace costs.

Determining exact shipping schedules is difficult in the furnace field where more and more units

are being custom-tailored to fit buyer requirements, but in general terms, delivery isn't a problem in the current market. Getting a small tempering unit, for example, would probably take about 8 weeks. On the other hand, a large pit type carburizer would require about 20 weeks.

**Advice For Purchasers** — Supplier suggestion to buyers: Start your thinking with process needs and not the furnace in mind. "Begin with the workpiece," urges one manufacturer. "The application determines the job to be done," says another.

Builders caution that selecting a certain type or model of furnace at the beginning is often unsound from both a purchasing and production standpoint. It's wiser to let the processing needs determine the equipment required. Study may

turn up a faster or better way to do the job. It may point out ways in which to better integrate heat treating into production activities. New methods can, perhaps, give a heat treater the competitive jump in terms of processing for years to come.

**Choice Of Firing** — Both gas fired and electric furnaces are growing in use. Selection of the heating medium depends on such factors as availability, cost and the processing needs. Another tip from manufacturers to buyers: Investigate the fuel and power situation with local utility personnel in your area before making any decision about firing methods.

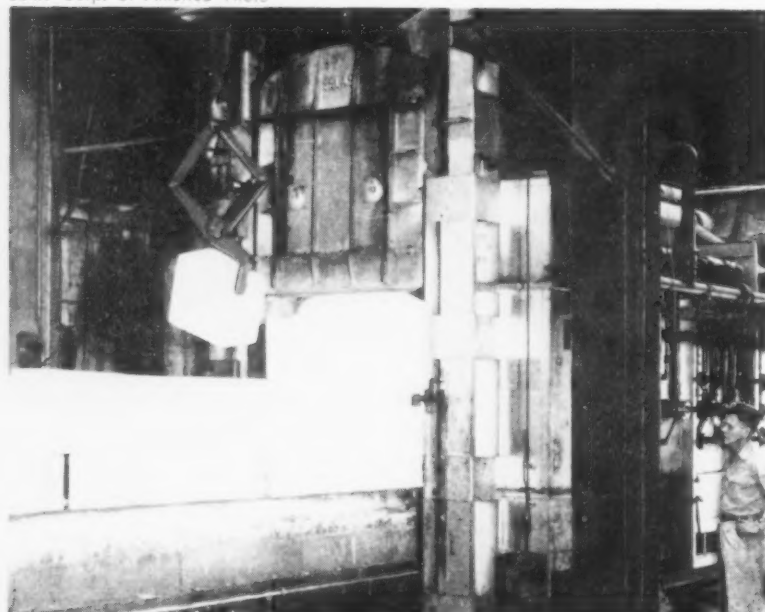
**Design Trends** — Heat process equipment makers are giving more attention to furnace mechanization, greater use of instrumentation, continuous processing (where practical), automatic handling of the work, and faster heating at higher speeds.

In the area of protective atmosphere furnaces there's more and more emphasis on finding better means to measure and control the atmosphere.

There's a growing trend toward fitting heat operations right into the production line, instead of regarding them as a separate processing step. Many operations, however, are best suited to batch equipment.

**Replacement Help** — There's some encouraging news for furnace owners buying replacement parts. Following the government's decision to suspend stockpiling nickel in 1957, replacement buyers were advised they no longer needed to supply nickel alloy scrap when ordering. Formerly requests for parts using nickel alloys required a scrap return in order to be filled.

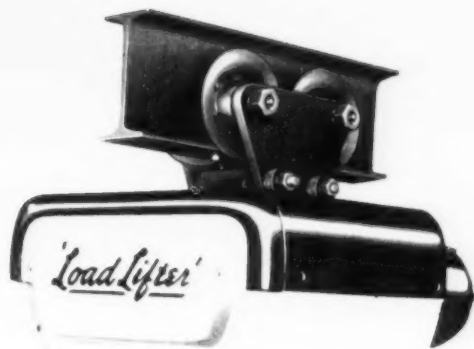
Selas Corp. of America Photo



**SPEED REPLACES SPACE:** Enlarging heat treat area proved unnecessary when new furnace reduced hardening time on die blocks from 20-24, down to 4-5 hours, took over about half production load of twelve furnaces.

# FAST

## 'LOAD LIFTER' BREAKS PRODUCTION JAMS

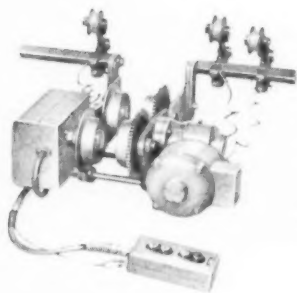
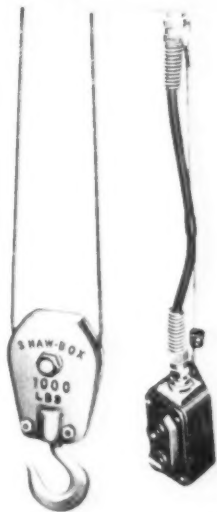


Keep production machines "well fed" and processing costs tumble. You can do it with the speedy Series "600" 'Load Lifter' Electric Hoist. Push a button and it lifts  $\frac{1}{2}$ -ton loads at 30 FPM. Two separate brakes — load brake and motor brake — act together, automatically. Each brake is so powerful it can hold the full load alone. Braking is so quick, the load doesn't drop back — accurate spotting is a cinch. No time wasted trying and trying to position loads.

The "600" gives you more than safe two-brake control. There are only 24 volts at the push buttons. Every component is extra tough to safeguard man, load and hoist. And when narrow-angle-side lifts are necessary, the flexible wire rope makes the job easy, and safe.

The Series "600" 'Load Lifter' has a simple mechanism and anti-friction bearings to hold down power consumption — to assure smooth operation. The entire hoist is built for economy. It can be serviced easily in the air. No long shut-downs to hold up production.

Invest in the Series "600" 'Load Lifter' Electric Hoist and get more lifts per hour. It is available in  $\frac{1}{2}$  and 1 ton sizes, with lug or hook suspension or with push type or motor-driven trolley. Get complete details from your "Shaw-Box" Distributor or write us for Bulletin 408.



**Motor-Driven Trolley** for Series "600" 'Load Lifter'. Travels at 100 FPM — saves time and effort — smooths out production flow. Hoist may be delivered equipped with trolley or trolley can be supplied for "600" hoists already in service. Installation takes only two hours with common tools.



**Cord Reels** to keep the hoist conductor cord taut and up out of the way of work and worker. Also useful for small cranes and other devices with motors up to  $7\frac{1}{2}$  Hp.



**'Load Lifter' Jib Cranes.** Self supporting. Full revolving. Swing easily on ball bearings. A hoist on this crane can serve a 500 sq. ft. work area. Capacities to 5 tons.



### 'Load Lifter' ELECTRIC HOISTS

**MANNING, MAXWELL & MOORE, INC.**

SHAW-BOX CRANE & HOIST DIVISION  
382 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and "LOAD LIFTER" Cranes, "BUDGIT" and "LOAD LIFTER" Hoists and other lifting specialties. Other Divisions produce "ASHCROFT" Gauges, "HANCOCK" Valves, "CONSOLIDATED" Safety and Relief Valves, "AMERICAN" and "AMERICAN-MICROSEN" Industrial Instruments, and Aircraft Products.

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.

# Sheet Mills Bank On September Pickup

**Buyers of light plate notified mills will cut back on that product next month.**

**By then producers count on being busy filling requests for sheet and strip.**

■ Sheet producers are setting their sights on September as the month for a market pickup.

Word that production of light plate on sheet-strip facilities will be cut back next month indicates the shift in their thinking. While August demand for the continuous mill plate product is good, the mills are flashing the caution sign on September bookings. Reason: They expect to be busy with sheet and strip rolling by then.

As yet the needed sheet and strip orders haven't materialized but producers are clearly banking on an order surge to close out the third quarter. Therefore they're offering buyers notice that light plate orders will probably get the cold shoulder after the current month ends.

Of course, just how good the third quarter turns out to be depends to a large extent on automotive ordering. Automakers are getting off to a flying start—some of them a month earlier this year.

It almost assures steel mills early ordering of sheet, strip, bar, and wire.

**Plate**—Mills are going slow on committing themselves on September orders for light plate until they get a good look at sheet and strip demand. The heavier plate market in the **East** seems a sure bet to continue tight. Bethlehem has notified customers that tonnage from its new

160 in. sheared plate mill at Sparrows Pt. in September will be only 60 pct that of July and August. Production difficulties are the reason. And Colorado Fuel & Iron's 160 in. sheared mill at Claymont, Del., was down most of July for maintenance. Strong flow of plate from Eastern and Midwestern mills leads one **Western** mill executive to say, "We can sell all we make without trouble." Nevertheless, plate  $\frac{1}{2}$  in. or more thick is still hard to get.

**Bar**—Automotive buying should give the market a needed shot in the arm in September and October. Meanwhile, August production is expected to be slightly better than July's. Stainless bar, along with carbon, is currently weak. **Detroit** mills see some activity in cold-finished bar. Automotive bars are holding up well on the **West Coast** and are expected to get even stronger in the fall.

**Pipe and Tubing**—Sales of welded pipe, excluding conduit, continue to drag. However, despite some reduction in oil drilling activity and talk of order easing, oil country seamless remains strong.

**Stainless**—There's little optimism among stainless producers about

## PURCHASING AGENT'S CHECKLIST

Steelmakers will make a strong case for their pricing policies when hearings begin. **P. 56**

More metalworking companies going in for paper wipers. **P. 58**

Little hope for an early end to upward price spiral. **P. 73**

buyer ordering. Business is very competitive with delivery speed often deciding who gets the sale. One Midwestern mill reported losing an order even though it quoted one week delivery on first half of the tonnage and two weeks for final shipment. Again August is seen as a better month for the mills, by a slight margin, than was July.

**Sheet and Strip**—On present indications August ordering will top July tonnages. Succeeding months should show a strong pickup. While gaps still exist in third quarter order books, mills indicate a lot of customers are "thinking" in terms of orders. Some producers are restricting the amount of continuous mill plate bookings they will accept for September. They expect to be processing sheet and strip tonnage on the mills by then. August orders are up sharply over July's at **Pittsburgh**. Belief there is that automotive sheet will progress upward in August and September with peak coming in October. At **Detroit** one of the big three automakers has increased August sheet orders. Mills there expect August to show improvement over July. While September ordering still is being made, that month looks good now. **Eastern** mills are trying, without notable success, to get customers to order early. They, too, are reducing amount of sheet-strip mill rolling of light plate they'll accept for September. **Cleveland** area mills indicate they have h-r and c-r sheet available for September delivery.

**Wire Products**—Customers are doing a lot of shopping around among the mills closest to them to reduce freight costs. Production continues low, but September and October look more promising. Fastener makers apparently have heavy finished goods inventories and little raw steel. Auto parts makers are waiting for new model orders before buying.

**Correction** — Composite price given in July 25th issue of \$67.00 a ton for malleable pig iron in the Valley was incorrect. Correct composite is \$66.50.



# COMPARISON OF PRICES

(Effective July 30, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	July 30 1957	July 23 1957	June 30 1957	July 31 1956
<b>Flat-Rolled Steel:</b> (per pound)				
Hot-rolled sheets	4.925e	4.925e	4.675e	4.325e
Cold-rolled sheets	6.05	6.05	5.75	5.325
Galvanized sheets (10 gal.)	6.60	6.60	6.30	5.85
Hot-rolled strip	4.925	4.925	4.675	4.325
Cold-rolled strip	7.17	7.17	6.870	6.28
Plate	5.12	5.12	4.87	4.52
Plates, wrought iron	13.15	13.15	10.40	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	50.00	44.50
<b>Tin and Terneplate:</b> (per base box)				
Tinplate (150 lb.) cokes	\$10.30	\$10.30	\$10.30	\$9.85
Tin plates, electro (1050 lb.)	9.00	9.00	9.00	8.55
Special coated mfg. ternes	9.55	9.55	9.55	9.10
<b>Bars and Shapes:</b> (per pound)				
Merchant bars	5.425e	5.425e	5.075e	4.62e
Cold finished bars	7.30	7.30	6.85	5.90
Alloy bars	6.475	6.475	6.125	5.65
Structural shapes	5.275	5.275	5.00	4.60
Stainless bars (No. 302)	45.00	45.00	43.25	38.25
Wrought iron bars	14.45	14.45	11.50	11.50
<b>Wire:</b> (per pound)				
Bright wire	7.65e	7.65e	7.20e	6.60e
<b>Rails:</b> (per 100 lb.)				
Heavy rails	\$5.525	\$5.525	\$5.275	\$1.725
Light rails	6.50	6.50	6.25	5.65
<b>Semifinished Steel:</b> (per net ton)				
Re-rolling billets	\$77.50	\$77.50	\$74.00	\$68.50
Slabs, re-rolling	77.50	77.50	74.00	68.50
Forging, billets	90.00	90.00	91.50	84.50
Alloy blooms, billets, slabs	114.00	114.00	107.00	96.00
<b>Wire Rod and Skelp:</b> (per pound)				
Wire rods	6.15e	6.15e	5.80e	5.025e
Skelp	4.875	4.875	4.625	4.225
<b>Finished Steel Composite:</b> (per pound)				
Base price	5.967e	5.967e	5.670e	5.179e

## Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips.

## Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

## Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	July 30 1957	July 23 1957	June 30 1957	July 31 1956
<b>Pig Iron:</b> (per gross ton)				
Foundry, del'd Phila.	\$70.38	\$70.38	\$68.88	\$66.51
Foundry, Valley	66.50	66.50	65.00	60.50
Foundry, Southern Cin'tl	70.87	70.87	67.17	62.93
Foundry, Birmingham	62.50	62.50	59.00	57.67
Foundry, Chicago	66.50	66.50	65.00	63.00
Basic, del'd Philadelphia	69.88	69.88	68.38	65.73
Basic, Valley furnace	66.00	66.00	64.50	60.00
Malleable, Chicago	66.50	66.50	65.00	63.00
Malleable, Valley	66.50	66.50*	65.00	60.50
Ferromanganese, cents per lb.	12.75e	12.75e	12.75e	10.75e
74 to 76 pct Mn base.				
<b>Pig Iron Composite:</b> (per gross ton)				
Pig iron	\$66.15	\$66.15	\$64.56	\$61.36
<b>Scrap:</b> (per gross ton)				
No. 1 steel, Pittsburgh	\$55.50	\$55.50	\$55.50	\$55.00
No. 1 steel, Phila. area	52.50	52.50	51.50	50.50
No. 1 steel, Chicago	52.50	52.50	51.50	50.50
No. 1 bundles, Detroit	48.50	48.50	47.50	46.50
Low phos., Youngstown	57.50	57.50	56.50	55.50
No. 1 mach'y east, Pittsburgh	58.50	58.50	57.50	56.50
No. 1 mach'y east, Philadelphia	56.50	56.50	55.50	54.50
No. 1 mach'y east, Chicago	53.50	52.50	50.50	54.50
<b>Steel Scrap Composite:</b> (per gross ton)				
No. 1 heavy melting scrap	\$53.45	\$53.83	\$54.50	\$52.67
<b>Coke, Connellsville:</b> (per net ton at oven)				
Furnace coke, prompt	\$15.38	\$15.38	\$15.38	\$14.50
Foundry coke, prompt	\$17.50-\$19	\$17.50-\$19	\$17.50-\$19	\$17.50
<b>Nonferrous Metals:</b> (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.25	29.25	29.25	28.00
Copper, Lake, Conn.	29.25	29.25	29.25	28.00
Tin, Straits, N. Y.	96.75*	95.875*	97.375	100.25
Zinc, East St. Louis	10.00	10.00	10.50	13.50
Lead, St. Louis	13.80	13.80	13.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	25.90
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	34.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

\* Tentative. † Average. \* Revised.

## PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

## STAINLESS STEEL

Base price cents per lb f.o.b. mill

←To identify producers, see Key on P. 146→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. R6	68.00	68.50	69.00	69.50	
Birmingham R1	62.00	62.50*			
Birmingham W9	62.00	62.50*	66.50		
Birmingham U4	62.00	62.50*	66.50		
Buffalo R1	66.00	66.50	67.00	67.50	
Buffalo H1	66.00	66.50	67.00	67.50	
Buffalo W6	66.00	66.50	67.00	67.50	
Chester P2	66.50	67.00	67.50		
Chicago J4	66.00	66.50	66.50	67.00	
Cleveland A5	66.00	66.50	66.50	67.00	71.00†
Cleveland R3	66.00	66.50	66.50	67.00	
Duluth J4	66.00	66.50	66.50	67.00	71.00†
Erie J4	66.00	66.50	66.50	67.00	71.00†
Everett M6	66.50	67.00	67.50		
Fontana K1	74.00	74.50			
Geneva, Utah C7	66.00	66.50			
Granite City G2	67.90	68.40	68.90		
Hubbard Y1			66.50		
Ironton, Utah C7	66.00	66.50			
Midland C11	66.00				
Minnequa C6	68.00	68.50	69.00		
Monessen P6	66.00				
Neville Is. P4	66.00	66.50	66.50	67.00	71.00†
N. Tona-wanda T1	66.00	66.50	67.00	67.50	
Sharpville S3	66.00	66.50	66.50	67.00	
So. Chicago R3	66.00	66.50	66.50		
So. Chicago W8	66.00	66.50	66.50	67.00	
Swedeland A2	68.00	68.50	69.00	69.50	
Toledo J4	66.00	66.50	66.50	67.00	
Troy, N. Y. R3	68.00	68.50	69.00	69.50	74.00
Youngstown Y1			66.50	67.00	

**DIFFERENTIALS:** Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct); 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct; \$2 per ton for 0.50 to 0.75 pct nickel; \$1 for each additional 0.25 pct nickel. \* Add \$1.00 for 0.31 to 0.60 pct phos. † Intermediate low phos. ‡ Add \$1.00 for 0.31 to 0.50 pct phos.

**Silvery Iron:** Buffalo 6 pct., J1, \$78.50; Jackson, J1, J4 (Globe Div.), \$77.25; Niagara Falls 15.01 15.50, \$101.00; Keokuk (14.01 14.50), \$103.50; (15.51 16.00), \$106.50. Add \$1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct); up to 18 pct. Add \$1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron under .10 pct phos., \$64.00. Add \$1.00 premium for all grades silvery to 18 pct.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingot, re-rol.	22.00	23.75	23.25	25.25		27.00	39.75*	32.25	37.00		16.75		17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50		21.50		21.75
Billets, forging		36.50		38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25		50.75	76.75	59.75	69.75	40.25	35.00		36.00
Sheets	48.50	49.25	51.25	52.00		55.50	81.50	65.50	79.25		40.25		40.75
Strip, hot-rolled	36.00	39.00	37.25	39.50		44.25	69.25	53.50	63.50		31.00		32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00		55.50	81.50	65.50	79.25	48.25	40.25		40.75
Wire CF, Rod HR		40.75	42.00	42.75	43.75	45.50	69.50	52.50	61.50	36.00	32.25	32.75	32.75

## STAINLESS STEEL PRODUCING POINTS:

**Sheets:** Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, Et; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., J2.

**Strip:** Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leeburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Harrison, N. J., D3; Youngstown, C3; Sharon, Pa., S2; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1; New Bedford, Mass. (.25¢ per lb higher), R6; Gary, U1 (.25¢ per lb higher).

**Bar:** Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5, R3; Ft. Wayne, J4; Philadelphia, D5; Detroit, R5; Gary U1.

**Wire:** Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

**Structurals:** Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

**Plates:** Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Philadelphia, D5; Vandergrift, Pa., U1; Gary, U1;

**Forgings/billets:** Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse C11; Detroit R5; Munhall, Pa., S. Chicago, U1.

# Factory Lists Bring Higher Prices

**Growing scarcity of industrial scrap forces up prices in important areas.**

**Dealer scrap momentarily soft. But downturn is not considered a trend as steel market firms.**

■ Industrial scrap lists were on the rise this week for two reasons: (1) anticipation of a temporary scarcity during the coming auto model changeover period, and (2) the general letdown in generation of this material due to widespread vacation shutdowns of metalworking plants.

But dealer scrap is scarcely holding its own in most markets. Prices dropped in two important consuming areas, rose in a third on speculative broker bidding. The IRON AGE Composite price dropped to \$53.50 from last week's \$53.83, an increase of 33¢.

**Factory Lists Up**—In Cleveland, local auto lists went for over \$56, up about \$3 from last month. Industrial bundles in Pittsburgh brought over \$63, nearly \$3 higher than last month. In Detroit, indications were that industrial lists would close higher. One Detroit broker estimated that only 30,000 tons of bundles are available from industrial lists this month.

While automakers and their suppliers are turning out fairly heavy tonnages of scrap at the present time, the tonnage will drop sharply as assembly lines are closed down during the model change over.

**Dealer Prices Soften** — The slightly easier tone in dealer steel-making grades in some markets apparently reflects a momentary adjustment rather than a significant weakness. Brokers and dealers are aware of the upturn in steel demand which is likely to continue in the months ahead.

**Pittsburgh**—Price of No. 1 heavy melting is down \$1. The price of No. 2 bundles is up \$1. Dealers are holding comfortable stocks of No. 1. Brokers have dropped their quotations to dealers and have offered to sell one mill at a reduced figure. On secondary grades, there was another small mill buy at \$1 over last week's price.

**Chicago**—Though scrap movement to mills continued slow, prices are advancing. Some speculative buying by brokers, along with reluctance by dealers to ship at present price levels, forced up prices along the entire list. This was despite strong mill resistance.

**Philadelphia**—The price of No. 1 heavy melting steel eased down another \$1 as the summer doldrums continues on the domestic market. No. 2 bundles dropped 50¢ a ton, but No. 2 heavy melting, dealers bundles, and factory bundles held steady. Low phos and electric furnace grades dropped \$1. About 90 pct of scrap shipments in this market is heading for the piers.

**New York**—While scrap delivered for export is commanding higher prices, broker prices on the domestic market caused a \$1 drop in No. 1 heavy melting. However,

No. 2 heavy melting has improved \$1 due to export quotas.

**Detroit**—Industrial lists are in the process of closing, with early returns showing bids for No. 1 bundles running in the \$57-\$59 range. In the absence of sales, dealers are sitting tight and looking for something to break in the market soon.

**Cleveland**—Speculation on high 4th quarter steel operations is pushing up prices on industrial lists and railroad scrap. But the dealer market continues dull. Dealers are sitting on inventories. Local auto lists went for over \$56, up about \$3 from a month ago.

**St. Louis**—Outside pressure for scrap originating in this area continues to strengthen the market, bringing higher prices for some items. Movement of scrap continues slow and below the melt.

**Birmingham** — Cast iron scrap went up this week when one large local consumer entered into the market. Recent railroad and industrial lists indicate a stronger tone for these grades.

**Cincinnati**—Broker buying prices are up \$1 on primary and \$2 on secondary steelmaking grades in anticipation of good mill purchases for the month. Rails are also up, due to selective buying by consumers.

**Buffalo**—A small sale of cast iron was made here at \$2 above quoted prices. This sent the price of No. 1 cupola cast to \$47-\$48, and No. 1 machinery cast to \$52-\$53. Otherwise, there was little market activity.

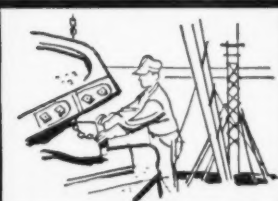
**Boston** — Steelmaking grades dropped \$1 a ton this week in a dull market. Buyers are few and far between. Neither domestic demand nor export give any sign of perking up. The lull has persisted for the last month.

**West Coast** — With export at a virtual halt, prices are down. However, one major mill for the first time in a long while is entering the market for substantial tonnages.



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# SCRAP PRICES

(Effective July 30, 1957)

## Pittsburgh

No. 1 hvy. melting	\$55.00 to \$56.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 dealer bundles	55.00 to 56.00
No. 1 factory bundles	63.00 to 64.00
No. 2 bundles	47.00 to 48.00
No. 1 busheling	55.00 to 56.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and ms. turn.	33.00 to 34.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. punchings plate	63.00 to 64.00
Heavy turnings	50.00 to 51.00
No. 1 RR hvy. melting	64.00 to 65.00
Scrap rails, random lgh.	72.00 to 73.00
Rails 2 ft and under	75.00 to 76.00
RR steel wheels	71.00 to 72.00
RR spring steel	71.00 to 72.00
RR couplers and knuckles	71.00 to 72.00
No. 1 machinery cast.	58.00 to 59.00
Cupola cast	49.00 to 50.00
Heavy breakable cast.	47.00 to 48.00

## Chicago

No. 1 hvy. melting	\$52.00 to \$53.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 dealer bundles	53.00 to 54.00
No. 1 factory bundles	60.00 to 61.00
No. 2 bundles	42.00 to 43.00
No. 1 busheling	52.00 to 53.00
Machine shop turn.	34.00 to 35.00
Mixed bor. and turn.	36.00 to 37.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. forge crops	64.00 to 65.00
Low phos. punchings plate	61.00 to 62.00
No. 1 RR hvy. melting	73.00 to 74.00
Scrap rails, random lgh.	81.00 to 82.00
Rolling rails	79.00 to 80.00
Rails 2 ft and under	65.00 to 66.00
Locomotive tires cut	66.00 to 67.00
Cut bolsters & side frames	69.00 to 70.00
Angles and splice bars	82.00 to 83.00
RR steel car axles	63.00 to 64.00
RR couplers and knuckles	53.00 to 54.00
No. 1 machinery cast.	48.00 to 49.00
Cupola cast	43.00 to 44.00
Heavy breakable cast.	43.00 to 44.00
Cast iron brake shoe	54.00 to 55.00
Cast iron wheels	62.00 to 63.00
Malleable	46.00 to 47.00
Stove plate	65.00 to 66.00
Steel car wheels	65.00 to 66.00

## Philadelphia Area

No. 1 hvy. melting	\$52.00 to \$53.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 dealer bundles	53.00 to 54.00
No. 2 bundles	42.50 to 43.50
No. 1 busheling	53.00 to 54.00
Machine shop turn.	35.00 to 36.00
Mixed bor. short turn.	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Shoveling turnings	38.00 to 39.00
Clean cast. chem. borings	43.00 to 44.00
Low phos. 3 ft and under	57.00 to 58.00
Low phos. 2 ft and under	58.00 to 59.00
Low phos. punchings	58.00 to 59.00
Elec. furnace bundles	56.00 to 57.00
Heavy turnings	48.00 to 49.00
RR steel wheels	65.00 to 66.00
RR spring steel	65.00 to 66.00
Rails 18 in. and under	71.00 to 72.00
Cupola cast	46.00 to 47.00
Heavy breakable cast.	52.00 to 53.00
Cast iron car wheels	57.00 to 58.00
Malleable	61.00 to 62.00
Unstripped motor blocks	41.00 to 42.00
No. 1 machinery cast.	56.00 to 57.00

## Cleveland

No. 1 hvy. melting	\$53.00 to \$54.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	53.00 to 54.00
No. 1 factory bundles	57.50 to 58.50
No. 2 bundles	43.00 to 44.00
No. 1 busheling	53.00 to 54.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Cut structural & plates, 2 ft & under	61.00 to 62.00
Drop forge flashings	53.00 to 54.00
Low phos. punchings plate	54.00 to 55.00
Foundry steel, 2 ft & under	55.00 to 56.00
No. 1 RR heavy melting	57.00 to 58.00
Rails 2 ft and under	73.00 to 74.00
Rails 18 in. and under	74.00 to 75.00
Railroad grate bars	35.00 to 36.00
Steel axle turnings	33.00 to 34.00
Railroad cast.	56.00 to 57.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	50.00 to 51.00
Malleable	62.00 to 63.00

## Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

## Youngstown

No. 1 hvy. melting	\$56.00 to \$57.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	56.00 to 57.00
No. 2 bundles	44.00 to 45.00
Machine shop turn.	33.00 to 34.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. plate	57.00 to 58.00

## Buffalo

No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 busheling	45.00 to 46.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	31.00 to 32.00
Low phos. plate	52.00 to 53.00
Scrap rails, random lgh.	56.00 to 57.00
Rails 2 ft and under	66.00 to 67.00
RR steel wheels	53.00 to 54.00
RR spring steel	49.00 to 50.00
RR couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	52.00 to 53.00
No. 1 cupola cast.	47.00 to 48.00

## Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$48.00 to \$49.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	48.00 to 49.00
Drop forge flashings	47.00 to 48.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. punchings plate	48.00 to 49.00
No. 1 cupola cast.	48.00 to 49.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast.	54.00 to 55.00

## St. Louis

No. 1 hvy. melting	\$47.00 to \$48.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	32.00 to 33.00
Cast iron borings	33.00 to 34.00
Shoveling turnings	33.00 to 34.00
No. 1 RR hvy. melting	59.00 to 60.00
Rails, random lengths	66.00 to 67.00
Rails 18 in. and under	73.00 to 74.00
Locomotive tires uncut	59.00 to 60.00
Angles and splice bars	62.00 to 63.00
Std. steel car axles	72.00 to 73.00
RR specialties	63.00 to 64.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	41.00 to 42.00
Cast iron brake shoes	43.00 to 44.00
Stove plate	44.50 to 45.50
Cast iron car wheels	49.00 to 50.00
Rolling rails	77.00 to 78.00
Unstripped motor blocks	40.00 to 41.00

## Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$41.00 to \$42.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	41.00 to 42.00
Elec. furnace, 3 ft & under	46.00 to 47.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and short turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Clean cast. chem. borings	31.00 to 32.00
No. 1 machinery cast.	40.00 to 41.00
Mixed cupola cast.	33.00 to 34.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	31.00 to 32.00

## New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$43.00 to \$50.00
No. 2 hvy. melting	41.00 to 42.00
No. 2 dealer bundles	39.00 to 40.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast.	46.00 to 47.00
Mixed yard cast.	41.00 to 42.00
Charging box cast.	46.00 to 47.00
Heavy breakable cast.	46.00 to 47.00
Unstripped motor blocks	33.00 to 34.00

## Birmingham

No. 1 hvy. melting	\$49.00 to \$50.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	49.00 to 50.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	49.00 to 50.00
Machine shop turn.	36.50 to 37.50
Shoveling turnings	37.50 to 38.50
Cast iron borings	28.00 to 29.00
Electric furnace bundles	51.00 to 52.00
Elec. furnace, 3 ft & under	48.00 to 49.00
Bar crops and plate	55.00 to 56.00
Structural and plate, 2 ft.	55.00 to 56.00
No. 1 RR hvy. melting	55.00 to 56.00
Scrap rails, random lgh.	60.00 to 61.00
Rails, 18 in. and under	66.00 to 67.00
Angles & splice bars	60.00 to 61.00
Rerolling rails	75.00 to 76.00
No. 1 cupola cast.	54.00 to 55.00
Stove plate	54.00 to 55.00
Charging box cast.	37.00 to 38.00
Cast iron car wheels	46.00 to 47.00
Unstripped motor blocks	44.00 to 45.00

## Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$52.00 to \$53.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	51.00 to 52.00
No. 2 bundles	43.00 to 44.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	30.00 to 31.00
Low phos. 18 in. and under	59.00 to 60.00
Rails, random lengths	64.00 to 65.00
Rails, 18 in. and under	71.00 to 72.00
No. 1 cupola cast.	45.00 to 46.00
Hvy. breakable cast.	43.00 to 44.00
Drop broken cast.	55.00 to 56.00

## San Francisco

No. 1 hvy. melting	\$48.00
No. 2 hvy. melting	46.00
No. 1 dealer bundles	47.00
No. 2 bundles	33.50 to 34.00
Machine shop turn.	30.00 to 31.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	48.00
No. 1 cupola cast.	55.00

## Los Angeles

No. 1 hvy. melting	\$46.00 to \$47.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	45.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	30.00 to 31.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	30.00 to 31.00
Elec. turn, 1 ft and under (foundry)	61.00
No. 1 RR hvy. melting	49.00 to 47.00
No. 1 cupola cast.	53.50

## Seattle

No. 1 hvy. melting	\$47.00
No. 2 hvy. melting	43.00
No. 2 bundles	30.00
No. 1 cupola cast.	47.00
Mixed yard cast.	47.00

## Hamilton, Ont.

No. 1 hvy. melting	\$45.00
No. 2 hvy. melting	45.00
No. 1 dealer bundles	45.00
No. 2 bundles	34.00
Mixed steel scrap	42.00
Busheling	36.00
Bush., new fact., prep'd.	45.00
Bush., new fact., unprep'd	39.00
Machine shop turn.	22.00
Short steel turn.	30.00
Mixed bor. and turn.	24.00
Rails rerolling	56.00
Cast scrap	52.00



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# Aluminum Price Up 1c As Expected

**Alcoa makes first announcement, effective Aug. 1.**

**Rise is across-the-board, and averages about 4 pct.**

**Lead-zinc consumers oppose sliding scales tariffs, but stay off the record.**

■ Early this week Aluminum Co. of America officially announced what had been universally expected—a 1¢ per lb increase in the price of aluminum.

The price boost is effective with shipments August 1, and is across-the-board.

Pig will cost 26¢ per lb, ingot 28.10¢ per lb, both freight allowed. New prices for various alloys and mill products will be available by the end of the week.

Reynolds Metals Co. and Kaiser Aluminum & Chemical Co. are expected to follow suit.

The price increase averages about 4 pct, says Alcoa, compared to a 7 pct increase in labor costs called for by the contract with United Steel Workers.

**Higher Purity**—Alcoa also announced that it is now guaranteeing its pig aluminum is no less than 99.5 pct pure. Standard since 1942 for the industry has been 99 pct. Alcoa chalks the improvement up to technological advancement, says there is no added charge for the additional purity.

## Lead and Zinc

While domestic lead and zinc producers have been making headlines rallying around the Administration's sliding scale tariff proposals, (THE IRON AGE, June

6, p. 154), consumers and representatives of foreign producers have been relatively silent.

Consumers are likely to remain quiet because the subject of tariffs is a tender one with them. Most are in favor of protective tariffs on products they make. They feel anything they say against a protective tariff for domestic lead and zinc producers might boomerang.

**Consumers Opposed** — Unofficially, almost all are opposed to the current proposal. The purchasing agent of one major lead user sums up the position of the consumers: "Lead and zinc customers prefer a stable price, and we'd just as soon it be high enough to support domestic industry. But we think the producers should keep the interest of their customers in mind."

The consensus among zinc and lead users seems to favor support of prices at levels around what they were before the current market sag—13½¢ per lb for zinc, 16¢ for lead.

Many users also object to the sliding scale method on the grounds that it will promote violent price fluctuation. The feeling seems to be that foreign producers will wait for spots when the tariff is at its lowest to rush in large quantities of metal, rather than ship at regular intervals.

**Speaks for Foreign Suppliers**—The loudest voice on the other side of the fence has been Jean Vuillequez, vice president in charge of sales, American Metal Co., New York. American Metal has extensive overseas interests, including zinc-lead mines and refineries in Canada and Mexico.

Mr. Vuillequez presented a prepared address and submitted to extensive questioning before the Senate Finance Committee hearings (THE IRON AGE, July 25, p. 154). He will also appear before the House Ways and Means Committee late this week.

The American Metal sales head offered some counterproposals for protecting domestic lead and zinc producers, along with evidence supporting his stand. Basically, Mr. Vuillequez believes, "The best solution is to leave the market alone. The free play of supply and demand will eventually bring about a proper balance."

**U. S. Costs Lower**—As to the contention that this would favor foreign operations, Mr. Vuillequez quotes from hearings before the Tariff Commission in 1953: "The information available to the Commission indicates that the total principal operating expenses (lead and zinc), as well as expenses for wages and salaries, are lower per ton of crude ore mined in the United States than in Canada and Mexico." But Mexican and Canadian producers do have a definite overall cost advantage, based on their higher grade ore, and more by-products, the Tariff Commission indicated. Cost per unit of recoverable metal is higher in the U. S.

## Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	28.10	27.10	8/1/57
Aluminum pig	26.00	25.00	8/1/57
Copper (E)	29.25	32.00	6/19/57
Copper (CS)	28.25	28.50	7/22/57
Copper (L)	29.25	32.00	6/19/57
Lead, St. L.	13.80	14.80	6/11/57
Lead, N. Y.	14.00	15.50	6/11/57
Magnesium ingot	36.00	34.09	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	200-250	250-275	6/6/57
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

**ALUMINUM:** 99% ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig. Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. **TIN:** see next page; other primary prices, pg. 142.

than either of the other two.

**Suggests Subsidy**—If the Administration and Congress feel some support of the domestic lead and zinc mines is necessary, Mr. Vuillequez suggests direct subsidies.

His plan: (a) a study to determine economic prices for lead and zinc, (b) when the price falls below these levels a subsidy should be paid to all producing mines pro rata to the decline in price; this should not be more than ½¢ per lb for each 1¢ the price drops below determined levels, (c) during periods the subsidy is paid, part of the subsidized metal should be bought for the permanent stockpile, (d) uneconomic mines should be kept on a standby basis.

## Copper

The half-year report from Kennecott President C. R. Cox to stockholders just about pegs the condition of the market this period.

Mr. Cox reports both dollar sales and net income were substantially off, although the company sold more copper. The main reason: the lower copper price.

(first half)	1957	1956
lb sales	283,171	270,215
Dollar sales	\$265 mil.	\$327 mil.
Net income	\$49 mil.	\$89 mil.
Av. price	31.75¢ lb	45¢ lb

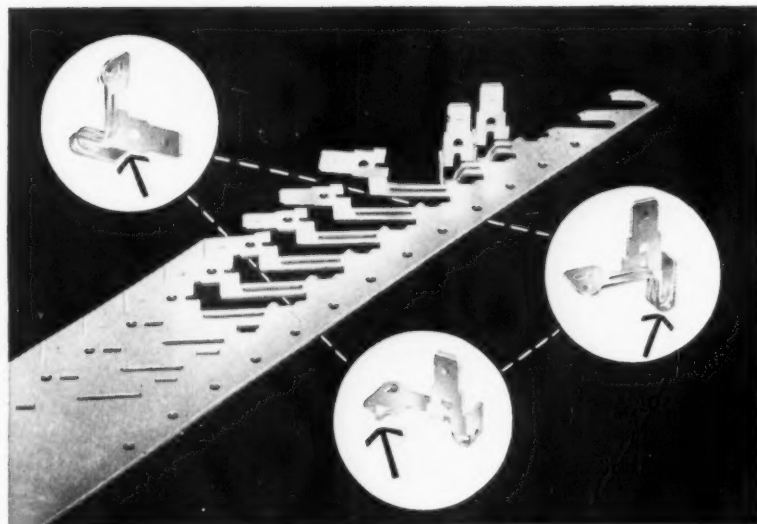
Mr. Cox predicts, "... a good demand in the second half of this year, showing strength in the fourth quarter."

## Tin

The Canadian Minister of Defense Production has notified the International Tin Council of his intention to dispose of stocks originally acquired for strategic purposes. The metal, 3000 tons, will be sold six months after the official notification. It will be offered to Canadian consumers, or as the Council directs.

Tin prices for the week: July 24—96.00; July 25—96.50; July 26—96.00; July 29—96.625; July 30—96.75.\*

\*Estimate



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# NONFERROUS PRICES (Effective July 30, 1957)

## MILL PRODUCTS

(Cents per lb unless otherwise noted)

### ALUMINUM

(Base 30,000 lb. f.o.b. shippt., frt. allowed)

#### Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	032	051	135-249	250-3
1800, 1100, 8008...	44.8	42.1	40.9	40.2
8089...	51.8	45.8	45.1	42.9
6061-0...	48.9	44.6	42.8	42.6

#### Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
8-8...	42.7-44.4	57.6-61.1
10-14...	43.4-44.8	58.4-62.7
16-20...	45.4-46.9	62.7-78.1
24-30...	54.8-55.4	91.5-94.9

#### Screw Machine Stock—2011-T-3

Size"	3/4	1/2-3/4	1/2-1	1 1/2-1 3/4
Price.....	89.7	88.8	57.4	55.2

#### Roofing Sheet, Corrugated

(Per sheet, 36" wide base, 16,000 lb)

Length"	73	96	120	144
.010 gage.....	\$1.852	\$1.803	\$2.254	\$2.704
.094 gage.....	1.886	2.252	2.815	3.378

## MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

#### Sheet and Plate

Type	Gage	250-300	250-200	188	081	032
AB1B Stand, Grade.....		67.9	69.0	77.9	108.1	
AB1B Spec.....		93.3	95.7	108.7	171.8	
Tread Plate.....		70.6	71.7			
Tooling Plate.....		78.0				

#### Extruded Shapes

Factor	8-8	12-14	24-26	35-38
Comm. Grade (AB1C).....	69.8	70.7	75.6	89.2
Spec. Grade... (AB1B).....	84.8	88.7	90.6	104.2

#### Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)  
AZ63A, AZ62A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

## NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

"A" Nickel	Monel	Inconel
Sheet, CR.....	126	106
Strip, CR.....	124	108
Rod, bar, HR.....	107	89
Angles, HR.....	107	89
Plates, HR.....	120	105
Seamless tube.....	157	129
Shot, blocks.....		87

## COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper.....	51.38	.....	48.61	51.57
Brass, 70/30.....	44.69	45.23	46.63	47.60
Brass, Low.....	47.40	47.94	47.34	50.21
Brass, R L.....	48.36	48.90	48.30	51.17
Brass, Naval.....	48.85	.....	43.16	52.26
Monel Metal.....	46.94	.....	42.75	.....
Comm. Br. ....	49.86	50.40	49.80	52.42
Mang. Br. ....	52.29	.....	46.69	.....
Phos. Br. 5%.....	70.47	.....	70.97	.....

Free Cutting Brass Rod ..... 32.87

## TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$9.50-\$10.60; alloy, \$14.75; Plate, HR, commercially pure, \$8.00-\$8.75; alloy, \$10.75. Wire, rolled and drawn, commercially pure, \$7.60-\$8.00; alloy, \$10.00; Bar, HR or forged, commercially pure, \$6.15-\$6.40; alloy, \$6.15-\$6.35; billets, HR, commercially pure, \$6.00-\$6.25; alloy, \$6.00-\$6.20.

## PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex., 33.50  
Beryllium aluminum 5% Be, Dollar per lb contained Be, \$74.75  
Beryllium copper, per lb cont'd Be, \$43.00  
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading, \$71.50  
Bismuth, ton lots, \$2.25  
Cadmium, de'd, \$1.70  
Calcium, 99.9%, small lots, \$4.55  
Chromium, 99.8% metallic basis, \$1.31  
Cobalt, 97-99% (per lb), \$2.00 to \$2.07  
Germanium, per gm, f.o.b. Miami, Okla., refined, \$39.50-\$53.50  
Gold, U. S. Treas., per troy oz., \$35.00  
Indium, 99.9%, dollars per troy oz., \$2.25  
Iridium, dollars per troy oz., \$90 to \$100  
Lithium, 98%, \$11.00 to \$14.00  
Magnesium, sticks, 100 to 500 lb., 59.00  
Mercury, dollars per 76-lb flask, f.o.b. New York, \$255 to \$257  
Nickel oxide sinter at Copper Cliff, Ont., contained nickel, 71.25  
Palladium, dollars per troy oz., \$23 to \$24  
Platinum, dollars per troy oz., \$81 to \$87  
Rhodium, \$120.00 to \$125.00  
Silver ingots (6 per troy oz.), 90.250  
Thorium, per kg., \$43.00  
Uranium, normal per kg., \$40.00  
Vanadium, \$3.45  
Zirconium sponge, \$10.00

## REMELTED METALS

### Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot  
No. 115 ..... 29.50  
No. 120 ..... 28.50  
No. 123 ..... 27.00  
80-10-10 ingot  
No. 305 ..... 33.50  
No. 315 ..... 31.50  
88-10-2 ingot  
No. 210 ..... 41.25  
No. 215 ..... 37.50  
No. 245 ..... 33.50  
Yellow ingot  
No. 405 ..... 24.00  
Manganese bronze  
No. 421 ..... 27.00

### Aluminum Ingot

(Cents per lb de'd 30,000 lb and over)

95-5 aluminum-silicon alloys  
0.20 copper max., 26.25-26.50  
0.60 copper max., 26.00-26.25  
Piston alloys (No. 122 type), 24.25-25.00  
No. 12 alum. (No. 2 grad.), 22.75-23.25  
108 alloy ..... 23.25-23.75  
195 alloy ..... 25.75-26.50  
13 alloy (0.60 copper max.), 26.00-26.25  
ANS-679 ..... 23.25-23.75

## Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97 1/2% ..... 21.25-21.75  
Grade 2—92-95% ..... 22.75-23.25  
Grade 3—90-92% ..... 21.75-22.25  
Grade 4—85-90% ..... 20.75-21.00

## SCRAP METALS

### Brass Mill Scrap

(Cents per pound, add 1c per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper.....	25 1/4	21 1/2
Yellow brass.....	19 1/4	17 1/2
Red brass.....	22 1/4	21 1/2
Comm. bronze.....	23 1/4	22 1/2
Mang. bronze.....	17 1/4	16 1/2
Yellow brass rod ends	18 1/4	

### Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ..... 21 1/2-25 1/4  
No. 2 copper wire ..... 22 1/2-25 1/4  
Light copper ..... 20 1/2-26 1/4  
\*Refinery brass ..... 21 1/2-26 1/4  
Copper bearing material ..... 21 1/4  
\*Dry copper content.

### Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ..... 21 1/2-25 1/4  
No. 2 copper wire ..... 22 1/2-25 1/4  
Light copper ..... 20 1/2-26 1/4  
No. 1 composition ..... 22 1/2  
No. 1 comp. turnings ..... 22 1/2  
Hvy. yellow brass solids ..... 16 1/4  
Brass pipe ..... 18 1/2  
Radiators ..... 17 1/2

### Aluminum

Mixed old cast, 14 1/2-15  
Mixed new clips ..... 16 1/2-17  
Mixed turnings, dry ..... 15-16

### Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

### Copper and Brass

No. 1 copper wire ..... 21-21 1/2  
No. 2 copper wire ..... 19 1/2-20  
Light copper ..... 17 1/2-18 1/2  
Auto radiators (unsweated) ..... 13 1/2-14  
No. 1 composition ..... 18 1/2-19  
No. 1 composition turnings ..... 18-18 1/2  
Cocks and faucets ..... 14 1/2-15  
Clean heavy yellow brass ..... 12 1/2-13  
Brass pipe ..... 15 1/2-16  
New soft brass clippings ..... 17-17 1/2  
No. 1 brass rod turnings ..... 14 1/4-14 1/2

### Aluminum

Alum. pistons and struts ..... 5 1/2-6  
Aluminum crankcases ..... 10 1/2-11  
1100 (2S) aluminum clippings ..... 13 1/2-14  
Old sheet and utensils ..... 10 1/2-11  
Borings and turnings ..... 6 1/2-7  
Industrial castings ..... 10 1/2-11  
2024 (24S) Clippings ..... 12-12 1/2

### Zinc

New zinc clippings ..... 4-4 1/2  
Old zinc ..... 3-3 1/2  
Zinc routings ..... 1 1/2-2  
Old die cast scrap ..... 1 1/2-1 3/4

### Nickel and Monel

Pure nickel clippings ..... 85-90  
Clean nickel turnings ..... 70-78  
Nickel anodes ..... 85-90  
Nickel rod ends ..... 85-90  
New Monel clippings ..... 45-48  
Clean Monel turnings ..... 35-40  
Old sheet Monel ..... 44-45  
Nickel silver clippings, mixed, 21  
Nickel silver turnings, mixed, 18

### Lead

Soft scrap lead ..... 9 1/2-10  
Battery plates (dry) ..... 4 1/2-4 3/4  
Batteries, acid free ..... 2 1/4-3

### Miscellaneous

Block tin ..... 75-76  
No. 1 pewter ..... 59-60  
Auto babbitt ..... 39-40  
Mixed common babbitt ..... 11-11 1/2  
Solder joints ..... 15 1/2-16  
Siphon tops ..... 42  
Small foundry type ..... 13-13 1/4  
Monotype ..... 13-13 1/4  
Lino. and stereotype ..... 12-12 1/4  
Electrotype ..... 11-11 1/4  
Hand picked type shells ..... 8-8 1/2  
Lino. and stereo. dross ..... 3 1/4-4  
Electro. dross ..... 3-3 1/4



**STEEL PRICES**

(Effective July 30, 1957)

	BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Behtlehem, Pa.		\$114.00 B3		5.325 B3	7.80 B3	5.325 B3						
	Buffalo, N. Y.	\$77.50 R3, B3	\$96.00 R3, B3	\$114.00 R3, B3	6.225 B3	5.325 B3	7.80 B3	5.325 B3	4.925 R3, B3	7.15 R7	7.325 B3		
	Phila., Pa.								7.70 P15				
	Harrison, N. J.												15.05 C11
	Conschohocken, Pa.		\$101.00 A2	\$121.00 A2				4.975 A2	7.20 A2	7.325 A2			
	New Bedford, Mass.								7.60 R6				
	Johnstown, Pa.	\$77.50 B3	\$96.00 B3	\$114.00 B3		5.325 B3	7.80 B3			7.70 T8			15.40 T8
	Boston, Mass.								7.60 R6				
	New Haven, Conn.								7.15 T8				15.05 T8
	Baltimore, Md.												
	Phoenixville, Pa.				5.50 P2		5.50 P2						
	Sparrows Pt., Md.							4.925 B3		7.325 B3			
MIDDLE WEST	Bridgeport, Wallingford, Conn.	\$80.50 N8	\$101.00 N8	\$114.00 N8					7.60 W1				
	Pawtucket, R. I. Worcester, Mass.								7.70 N7 7.70 A5				15.40 N7 15.20 T8
	Alton, Ill.							5.125 L1					
	Ashland, Ky.							4.925 A7					
	Canton-Maxillon, Dover Ohio		\$96.00 R3	\$114.00 R3, T5					7.15 G4		10.40 G4		14.85 C11
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	\$77.50 U1, R3	\$96.00 U1, R3, W8	\$114.00 U1, R3, W8	6.225 U1	5.275 U1, W8, P13	7.75 U1, Y1 6.525 W8	5.275 U1	4.925 W8, N4, A1	7.25 A1, T8, M8		8.10 W8, S9, J3	14.85 A1 S9, 15.05 G4
	Cleveland, Ohio								7.15 A5, J3			8.10 J3	
	Detroit, Mich.			\$114.00 R5				5.025 G3, M2	7.25 M2 D1 D2 G3, P2, P11	7.425 G3	10.60 G3, D2	8.10 G3	
	Anderson, Ind.								7.15 G4		10.40 G4		
	Duluth, Minn.												
	Gary, Ind. Harbor, Indiana	\$77.50 U1	\$96.00 U1	\$114.00 U1, Y1	6.225 I3	5.275 U1	7.75 U1, I3	5.25 I3	4.925 U1, I3, Y1	7.15 Y1	7.325 U1, I3, Y1	10.50 Y1	8.10 U1, Y1
	Sterling, Ill.	\$77.50 N4				5.275 N4		5.025 N4					
	Indianapolis, Ind.								7.30 C5				
	Newport, Ky.											8.10 A9	
	Middletown, Ohio												
	Niles, Warren, Ohio Sharon, Pa.		\$96.00 S1, C10	\$114.00 C10, S1				4.925 R3, S1	7.15 R3, T4, S1	7.325 R3, S1	10.30 S1, R3	8.10 S1	15.05 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	\$77.50 U1, P6	\$96.00 U1, C11, P6	\$114.00 U1, C11	6.225 U1	5.275 U1, J3	7.75 U1, J3	5.275 U1	4.925 P6	7.15 J3, B4, S7		8.10 S9	15.05 S9
	Portsmouth, Ohio												
	Weirton, Wheeling, Follansbee, W. Va.					5.275 W3		4.925 W3	7.15 W3, F3	7.325 W3	10.45 W3		
	Youngtown, Ohio	\$77.50 R3	\$96.00 Y1, C10	\$114.00 Y1		5.425 Y1	7.75 Y1		7.15 R3, Y1, C5	7.325 U1, Y1	10.50 Y1	8.10 U1, Y1	
WEST	Fontana, Cal.	\$88.00 K1	\$105.50 K1	\$135.00 K1		6.025 K1	8.50 K1	6.225 K1	5.775 K1	9.00 K1			
	Geneva, Utah		\$96.00 C7			5.275 C7	7.75 C7						
	Kansas City, Mo.					5.375 S2	7.85 S2		5.175 S2		7.575 S2	8.35 S2	
	Los Angeles, Torrance, Cal.		\$105.50 B2	\$134.00 B2		5.975 C7, B2	8.45 B2		5.675 C7, B2			9.30 B2	
	Minnequa, Colo.					5.575 C6			6.025 C6	9.10 K1			
	Portland, Ore.					6.025 O2							
	San Francisco, Niles, Pittsburg, Cal.		\$105.50 B2			5.925 B2	8.40 B2		5.675 C7, B2				
	Seattle, Wash.		\$109.50 B2			6.025 B2	8.50 B2		5.925 B2				
	Atlanta, Ga.					5.475 A8			5.125 A8				
	Fairfield, Ala. City, Birmingham, Ala.	\$77.50 T2	\$96.00 T2			5.275 T2, R3, C16	7.75 T2		4.925 T2, R3, C16 5.225 C10		7.325 T2		
SOUTH	Houston, Lone Star, Texas		\$101.00 S2	\$119.00 S2		5.375 S2	7.85 S2		5.175 S2		7.575 S2	8.35 S2	

## IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL  
PRICES(Effective  
July 30, 1957)

	SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
	Hot rolled 18 ga. & livert.	Cold- rolled	Galvan- ized	Enamel- ing	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25 lb. base box	Electro* 0.25 lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.925 B3	6.05 B3			7.275 B3	8.975 B3			6.15 W6	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 125 lb. deduct \$2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differ- ential 1.00 lb. 0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conschohocken, Pa.	4.975 A2	6.10 A2			7.325 A2							
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.15 B3			
	Fairless, Pa.	4.975 U1	6.10 U1			7.325 U1	9.025 U1				\$10.15 U1	\$8.95 U1	
	New Haven, Conn.												
	Phoenixville, Pa.												
MIDDLE WEST	Sparrows Pt., Md.	4.925 B3	6.05 B3	6.60 B3		7.275 B3	8.975 B3	9.725 B3		6.25 B3	\$10.15 B3	\$5.85 B3	
	Worcester, Mass.									6.45 A5			
	Trenton, N. J.												
	Alton, Ill.									6.35 L1			
	Ashland, Ky.	4.925 A7		6.60 A7	6.625 A7								
	Canton-Massillon, Dover, Ohio			6.60 R3, R1									
	Chicago, Joliet, Ill.	4.925 W8, A1				7.275 U1				6.15 A5, R3, W8, N4, K2			
	Sterling, Ill.									6.25 N4, K2			
	Cleveland, Ohio	4.925 R3, J3	6.05 R3, J3		6.625 R3	7.275 R3, J3	8.975 R3, J3			6.15 A5			
	Detroit, Mich.	5.025 G3, M2	6.15 G3, 6.05 M2			7.375 G2	9.075 G3						
MIDDLE WEST	Newport, Ky.	4.925 A1	6.05 A1										
	Gary, Ind. Harbor, Indiana	4.925 U1, J3, Y1	6.05 U1, J3, Y1	6.60 U1, J3	6.625 U1, J3, Y1	7.00 U1	7.275 U1, Y1, J3	8.975 U1, Y1		6.15 Y1	\$10.05 U1, Y1	\$8.75 J3, U1, Y1	7.50 U1, Y1
	Granite City, Ill.	5.125 G2	6.25 G2	6.80 G2	6.825 G2							\$8.85 G2	7.60 G2
	Kokomo, Ind.			6.70 C9						6.25 C9			
	Mansfield, Ohio		6.05 E2			7.00 E2							
	Middletown, Ohio		6.05 A7	6.60 A7	6.625 A7	7.00 A7							
	Niles, Warren, Ohio Sharon, Pa.	4.925 R3, N3, S1	6.05 R3	6.60 R3	6.625 N3, S1	7.00 N3, S1	7.275 R3	8.975 S1, R3				\$8.75 R3	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 U1, J3, P6	6.05 U1, J3, P6	6.60 U1, J3	6.625 U1		7.275 U1, R3, J3	8.975 U1, J3	9.725 U1	6.15 A5, J3, P6	\$10.05 U1, J3	\$8.75 U1, J3	7.50 U1, J3
	Portsmouth, Ohio	4.925 P7	6.05 P7							6.15 P7			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 W3, W5	6.05 W3, F3, W5	6.60 W3, W5		7.00 W3, W5	7.275 W3	8.975 W3			\$10.05 W5, W3	\$8.75 W5, W3	7.50 W5
WEST	Youngstown, Ohio	4.925 U1, Y1	6.05 Y1		6.625 Y1		7.275 Y1	8.975 Y1		6.15 Y1			
	Fontana, Cal.	5.775 K1	7.30 K1			8.125 K1	10.275 K1				\$10.80 K1	\$9.50 K1	
	Geneva, Utah	5.025 C7											
	Kansas City, Mo.									6.40 S2			
	Los Angeles, Torrance, Cal.									6.95 B2			
	Minnequa, Colo.									6.40 C6			
	San Francisco, Niles, Pittsburg, Cal.	5.625 C7	7.00 C7	7.35 C7						6.95 C7	\$10.80 C7	\$9.50 C7	
	Seattle, Wash.												
	Atlanta, Ga.												
SOUTH	Fairfield, Ala. Alabama City, Ala.	4.925 T2, R3	6.05 T2	6.60 T2, R3						6.15 T2, R3	\$10.15 T2	\$8.85 T2	
	Houston, Tex.									6.40 S2			

## IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

## STEEL PRICES

(Effective July 30, 1957)

EAST	Bethlehem, Pa.				6.475 B3	8.775 B3	7.925 B3					
	Buffalo, N. Y.	5.425 R3,B3	5.425 R3,B3	7.30R3,7.35B5	6.475 B3,R3	8.775 B3,B5	7.925 B3	5.10 B3		7.20 B2	7.625 B2	7.65 W6
	Claymont, Del.							5.70 P2		7.20 C4	7.625 C4	
	Coatesville, Pa.							5.50 L4		7.20 L4	7.55 L4	
	Conshohocken, Pa.							5.20 A2	6.175 A2	7.20 A2	7.625 A2	
	Harrisburg, Pa.							5.80 P2	6.275 P2			
	Milton, Pa.	5.575 M7	5.575 M7									
	Hartford, Conn.			7.50 R3		9.075 R3	7.925 B3					
	Johnstown, Pa.	5.425 B3	5.425 B3		6.475 B3			5.10 B3		7.20 B3	7.625 B3	7.65 B3
	Fairless, Pa.	5.575 U1	5.575 U1		6.625 U1							
	Newark, N. J.			7.75 W10		8.95 W10						
	Camden, N. J.			7.75 P10		8.95 P10						
	Bridgeport, Conn.	5.650 N8	5.650 N8	7.65 N8	6.550 N8	8.925 N8						
	Putnam, Conn.			7.85 W10								
	Willimantic, Conn.			7.80 J3								
MIDDLE WEST	Sparrows Pt., Md.		5.425 B3					5.10 B3		7.20 B3	7.625 B3	7.75 B3
	Palmer, Worcester, Readville, Mass.			7.85 B5,C14		9.075 A5,B5						7.95 A5, W6
	Mansfield, Mass.											
	Spring City, Pa.			7.75 K4		8.950 K4						
	Alton, Ill.	5.625 L1										7.85 L1
	Ashland,Newport,Ky.							5.10 A7,A1		7.20 A1		
	Canton, Massillon, Ohio			7.30 R3,R2	6.475 R3,T5	8.775 R3,R2,T5						
	Chicago, Joliet, Waukegan, Ill.	5.425 U1,R3, W8,N4,P13	5.425 U1,R3, N4,P13	7.30 A5, W10,W8, B5,L2,N9	6.475 U1,R3, W8	8.775 A5, W10,W8 L2,N9,B5	7.925 U1 6.675 W8	5.10 U1,A1, W8,I3	6.175 U1	7.20 U1,W8	7.625 U1 7.40 W8	7.65 A5,R3, W8,N4, K2,W7
	Harvey, Ill.											
	Cleveland, Ohio	5.425 R3	5.425 R3	7.30 A5,C13		8.775 A5, C13	7.925 R3	5.20 R3,J3	6.175 J3		7.625 R3, J3	7.65 A5, C13
	Detroit, Mich.	5.525 G3	5.775 G3	7.55 P3 7.50 P8,B5	6.475 R5 6.575 G3	8.775 R5 8.975 B5,P3, P8	8.025 G3	5.20 G3		7.35 G3		
	Duluth, Minn.											7.65 A5
	Gary, Ind. Harbor, Crawfordsville Hammond, Ind.	5.425 U1,I3, Y1	5.425 U1,I3, Y1	7.30 R3,M5, J3	6.475 U1,I3, Y1	8.775 R3,M4	7.925 U1,I3, Y1	5.10 U1,I3, Y1	6.175 J3,I3	7.20 U1,Y1	7.625 U1, Y1	7.75 M4
	Granite City, Ill.							5.30 C2				
	Kokomo, Ind.											7.75 C9
WEST	Sterling, Ill.	5.525 N4	5.525 N4					5.10 N4				7.75 K2
	Niles, Warren, Ohio Sharon, Pa.			7.30 C10	6.475 C10,S1	8.775 C10	7.925 S1	5.10 R3,S1		7.20 S1	7.625 R3, S1	
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 U1,J3	5.425 U1,J3	7.30 A5,B4, R3,J3,C11, W10,S9,C8	6.475 U1,J3, C11	8.775 A5, W10,R3,S9, C11,C8	7.925 U1,J3	5.10 U1,J3	6.175 U1	7.20 U1,J3	7.625 U1,J3	7.65 A5, J3,P6
	Portsmouth, Ohio											7.65 P7
	Weirton, Wheeling, Follansbee, W. Va.							5.10 W5				
	Youngstown, Ohio	5.425 U1,R3, Y1	5.425 U1,R3, Y1	7.30 A5,Y1, F2	6.475 U1,Y1	8.775 Y1,F2	7.925 U1,Y1	5.10 U1,R3, Y1		7.20 Y1	7.625 U1, R3,Y1	7.65 Y1
	Emeryville, Cal.	6.175 J5	6.175 J5		7.525 K1		8.625 K1	5.85 K1		7.95 K1	8.375 K1	
	Fontana, Cal.	6.125 K1	6.125 K1									
	Geneva, Utah							5.10 C7			7.625 C7	
	Kansas City, Mo.	5.675 S2	5.675 S2		6.725 S2		8.175 S2					7.90 S2
	Los Angeles, Torrance, Cal.	6.125 C7,B2	6.125 C7,B2	8.75 R3,P14	7.525 B2	10.65 P14	8.625 B2					8.66 B2
	Minneapolis, Colo.	5.875 C6	5.875 C6					5.95 C6				7.90 C6
	Portland, Ore.	6.175 O2	6.175 O2									
	San Francisco, Niles, Pittsburg, Cal.	6.125 C7 6.175 B2	6.125 C7 6.175 B2				8.675 B2					8.60 C7,C6
	Seattle, Wash.	6.175 B2,N6	6.175 B2				5.675 B2	6.00 B2		8.10 B2	8.525 B2	
SOUTH	Atlanta, Ga.	5.625 A8	5.625 A8									7.85 A8
	Fairfield, Ala. City, Birmingham, Ala.	5.425 T2,R3 C16	5.425 T2,R3, C16	7.90 C16		8.775 R3	7.925 T2	5.10 T2,R3			7.625 T2	7.65 T2,R3
	Houston, Ft. Worth, Lone Star, Tex.	5.675 S2	5.675 S2		6.725 S2		8.175 S2	5.20 S2 5.45 L3		7.30 S2	7.725 S2	7.90 S2

† Merchant Quality—Special Quality .35¢ higher.

# STEEL PRICES (Effective July 30, 1957)

## Key to Steel Producers

### With Principal Offices

- A1 Acme Steel Co., Chicago  
A2 Alan Wood Steel Co., Conahocken, Pa.  
A3 Allegheny Ludlum Steel Corp., Pittsburgh  
A4 American Cladmetals Co., Carnegie, Pa.  
A5 American Steel & Wire Div., Cleveland  
A6 Angel Nail & Chaplet Co., Cleveland  
A7 Armco Steel Corp., Middletown, Ohio  
A8 Atlantic Steel Co., Atlanta, Ga.  
A9 Acme Newport Steel Co., Newport, Ky.  
B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.  
B2 Bethlehem Pacific Coast Steel Corp., San Francisco  
B3 Bethlehem Steel Co., Bethlehem, Pa.  
B4 Blair Strip Steel Co., New Castle, Pa.  
B5 Bliss & Laughlin, Inc., Harvey, Ill.  
B6 Brook Plant, Wickwire Spencer Steel Div., Jirdaboro, Pa.  
C1 Calstrip Steel Corp., Los Angeles  
C2 Carpenter Steel Co., Reading, Pa.  
C3 Central Iron & Steel Co., Harrisburg, Pa.  
C4 Claymont Products Dept., Claymont, Del.  
C5 Cold Metals Products Co., Youngstown, O.  
C6 Colorado Fuel & Iron Corp., Denver  
C7 Columbia Geneva Steel Div., San Francisco  
C8 Columbia Steel & Shifting Co., Pittsburgh  
C9 Continental Steel Corp., Kokomo, Ind.  
C10 Copperweld Steel Co., Pittsburgh, Pa.  
C11 Crucible Steel Co. of America, Pittsburgh  
C12 Cumberland Steel Co., Cumberland, Md.  
C13 Cuyahoga Steel & Wire Co., Cleveland  
C14 Compressed Steel Shifting Co., Readville, Mass.  
C15 G. O. Carlson, Inc., Thorndale, Pa.  
C16 Connors Steel Div., Birmingham  
C17 Chester Blast Furnace, Inc., Chester, Pa.  
D1 Detroit Steel Corp., Detroit  
D2 Dearborn Div., Sharon Steel Corp.  
D3 Driver Harris Co., Harrison, N. J.  
D4 Dickson Weatherproof Nail Co., Evanston, Ill.  
E1 Eastern Stainless Steel Corp., Baltimore  
E2 Empire Steel Co., Mansfield, O.  
F1 Firth Sterling, Inc., McKeesport, Pa.  
F2 Fitzsimmons Steel Corp., Youngstown  
F3 Follansbee Steel Corp., Follansbee, W. Va.

- G2 Granite City Steel Co., Granite City, Ill.  
G3 Great Lakes Steel Corp., Detroit  
G4 Greer Steel Co., Dover, O.  
H1 Hanna Furnace Corp., Detroit  
I2 Ingersoll Steel Div., Chicago  
I3 Inland Steel Co., Chicago  
I4 Interlake Iron Corp., Cleveland  
J1 Jackson Iron & Steel Co., Jackson, O.  
J2 Jessop Steel Corp., Washington, Pa.  
J3 Jones & Laughlin Steel Corp., Pittsburgh  
J4 Joslyn Mfg. & Supply Co., Chicago  
J5 Judson Steel Corp., Emeryville, Calif.  
K1 Kaiser Steel Corp., Fontana, Cal.  
K2 Keystone Steel & Wire Co., Peoria  
K3 Koppers Co., Granite City, Ill.  
K4 Keystone Drawn Steel Co., Spring City, Pa.  
L1 Laclede Steel Co., St. Louis  
L2 La Salle Steel Co., Chicago  
L3 Lone Star Steel Co., Dallas  
L4 Lukens Steel Co., Coatesville, Pa.  
M1 Mahoning Valley Steel Co., Niles, O.  
M2 McLouth Steel Corp., Detroit  
M3 Mercer Tube & Mfg. Co., Sharon, Pa.  
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.  
M5 Monarch Steel Div., Hammond, Ind.  
M6 Mystic Iron Works, Everett, Mass.  
M7 Milton Steel Products Div., Milton, Pa.  
M8 Mill Strip Products Co., Evanston, Ill.  
N1 National Supply Co., Pittsburgh  
N2 National Tube Div., Pittsburgh  
N3 Niles Rolling Mill Div., Niles, O.  
N4 Northwestern Steel & Wire Co., Sterling, Ill.  
N6 Northwest Steel Rolling Mills, Seattle  
N7 Newman Crosby Steel Co., Pawtucket, R. I.  
N8 Northeastern Steel Corp., Bridgeport, Conn.  
N9 Nelson Steel & Wire Co.  
O1 Oliver Iron & Steel Co., Pittsburgh  
O2 Oregon Steel Mills, Portland  
P1 Page Steel & Wire Div., Monessen, Pa.  
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.  
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.  
P4 Pittsburgh Coke & Chemical Co., Pittsburgh  
P5 Pittsburgh Screw & Bolt Co., Pittsburgh  
P6 Pittsburgh Steel Co., Pittsburgh  
P7 Portsmouth Div., Detroit Steel Corp., Detroit

- P8 Plymouth Steel Co., Detroit  
P9 Pacific States Steel Co., Niles, Cal.  
P10 Precision Drawn Steel Co., Camden, N. J.  
P11 Production Steel Strip Corp., Detroit  
P13 Phoenix Mfg. Co., Joliet, Ill.  
P14 Pacific Tube Co.  
P15 Philadelphia Steel and Wire Corp.  
R1 Reeves Steel & Mfg. Co., Dover, O.  
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.  
R3 Republic Steel Corp., Cleveland  
R4 Roebling Sons Co., John A., Trenton, N. J.  
R5 J. & L. Steel Co., Stainless Div.  
R6 Rodney Metals, Inc., New Bedford, Mass.  
R7 Rome Strip Steel Co., Rome, N. Y.  
S1 Sharon Steel Corp., Sharon, Pa.  
S2 Sheffield Steel Div., Kansas City  
S3 Shenango Furnace Co., Pittsburgh  
S4 Simonds Saw and Steel Co., Fitchburg, Mass.  
S5 Sweet's Steel Co., Williamsport, Pa.  
S6 Standard Forging Corp., Chicago  
S7 Stanley Works, New Britain, Conn.  
S8 Superior Drawn Steel Co., Monaca, Pa.  
S9 Superior Steel Corp., Carnegie, Pa.  
S10 Seneca Steel Service, Buffalo  
T1 Tonawanda Iron Div., N. Tonawanda, N. Y.  
T2 Tennessee Coal & Iron Div., Fairfield  
T3 Tennessee Products & Chem. Corp., Nashville  
T4 Thomas Strip Div., Warren, O.  
T5 Timken Steel & Tube Div., Canton, O.  
T7 Texas Steel Co., Fort Worth  
T8 Thompson Wire Co., Boston  
U1 United States Steel Corp., Pittsburgh  
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.  
U3 Ulbrich Stainless Steels, Wallingford, Conn.  
U4 U. S. Pipe & Foundry Co., Birmingham  
W1 Wallingford Steel Co., Wallingford, Conn.  
W2 Washington Steel Corp., Washington, Pa.  
W3 Weirton Steel Co., Weirton, W. Va.  
W4 Wheatland Tube Co., Wheatland, Pa.  
W5 Wheeling Steel Corp., Wheeling, W. Va.  
W6 Wickwire Spencer Steel Div., Buffalo  
W7 Wilson Steel & Wire Co., Chicago  
W8 Wisconsin Steel Div., S. Chicago, Ill.  
W9 Woodward Iron Co., Woodward, Ala.  
W10 Wyckoff Steel Co., Pittsburgh  
W12 Wallace Barnes Steel Div., Bristol, Conn.  
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

## PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about \$200 per net ton.

STANDARD T. & C.	BUTTWELD												SEAMLESS											
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2-3 In.		2 In.		2 1/2 In.		3 In.		3 1/2-4 In.			
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.		
Sparrows Pt. B3	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50										
Youngstown R3	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50										
Fontana K1	+8.25	+23.5	+5.25	+19.5	+1.75	+15.60	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00										
Pittsburgh J3	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50		
Alton, Ill. L1	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50										
Sharon M1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50										
Fairless N2	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50										
Pittsburgh N1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50		
Wheeling W4	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50										
Youngstown Y1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50		
Indiana Harbor Y1	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.75	+0.75	14.25	+0.25	15.75	+0.50										
Lorain N2	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50		
EXTRA STRONG PLAIN ENDS																								
Sparrows Pt. B3	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50										
Youngstown R3	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50										
Fairless N2	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50										
Fontana K1	+3.75	0.25	list	3.25	3.75	4.25	4.75	5.25	5.75	6.25	6.75	7.25	7.75	8.25										
Pittsburgh J3	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50		
Alton, Ill. L1	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50										
Sharon M1	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50										
Pittsburgh N1	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50		
Wheeling W5	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50										
Wheatland W4	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50										
Youngstown Y1	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50		
Indiana Harbor Y1	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50										
Lorain N2	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.75	+16.0	2.25	+13.50	7.25	+8.50		

Threads only butt weld and seamless 2 1/2 pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5 1/2 pt. higher discount. Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts East St. Louis zinc price now 10¢ per lb.



To identify producers, see Key on preceding page

## MERCHANT WIRE PRODUCTS

	Standard Q Contd Nails	Woven Wire Fence	1 1/2" Fence Posts	Single Loop Bale Ties	Gals. Barbed and Twisted Barless Wire	March. Wire Ann'd	March. Wire Galv.
F.o.b. Mill	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City R3	173	187		212	193	8.65	9.20
Alquiappa J3***	173	190		190	190	8.65	9.325
Atlanta A8**	175			208	199	8.50	9.10
Bartonsville K2**	175	192	178	214	198	8.75	9.425*
Buffalo W6							
Chicago N***							
Cleveland A6							
Cleveland A5						8.65	
Crawf.dav. M4**	175	192		214	198	8.75	9.425
Donora, Pa. A5	173	187		212	193	8.65	9.20
Duluth A5	173	187		212	193	8.65	9.20
Fairfield, Ala. T2	173	187		212	193	8.65	9.20
Galveston D4	8.95						
Houston S2	178	192		217	198	8.90	9.45
Jacksonville M4	184	197	219	203	190	9.00	9.675
Johnstown B3**	173	190**	172	196**	8.65	9.325**	
Joliet, Ill. A5	173	187		212	193	8.65	9.20
Kokomo C9*	175	189*		214	195*	8.75	9.30
L. Angeles B2***						9.10	9.275
Kansas City S2*	178	192*		217	198*	8.90	9.45*
Minneapolis C6†	178	192†	177	217	198†	8.90	9.45†
Monacaen P6					193	8.65	9.20
Palmer, Mass. W6							
Pittsburg, Cal. C/	192	210			213	9.60	10.15
Rantzin, Pa. A5	173	187			213	8.65	9.20
So. Chicago R3	173	187			213	8.65	9.20
S. San Fran. C6†				236		9.60	10.15†
Sparrows Pt.B3**	175			214	198	8.75	9.425
Struthers, O. Y1*						8.65	9.30
Worcester A5	179					8.95	9.50

- \* Zinc less than .10¢.
- \*\* 11-12¢ zinc.
- \*\*\* .10¢ zinc.
- † Plus zinc extras.
- ‡ Wholesalers only.

### C-R SPRING STEEL

	CARBON CONTENT				
Cents Per Lb	0.26	0.41	0.61	0.81	1.06
F.o.b. Mill	0.40	0.60	0.80	1.05	1.35
Baltimore, Md. 78	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W12					
Roston 78	9.50	10.70	12.90	15.90	18.85
Bufile, N. Y. R7	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. S9	8.95	10.40	12.60	15.60	18.55
Cleveland 45	9.05	10.40	12.60	15.60	18.55
Dearborn S1	9.05	10.50	12.70		
Detroit D1	9.05	10.50	12.70		
Detroit D2	9.05	10.50	12.70		
Dover, O. G4	8.95	10.40	12.60	15.60	18.55
Evanson, Ill. M8	9.05	10.40	12.60		
Franklin Park, Ill. 78	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. C1			12.90	15.90	19.30
Indianapolis J1 C5					
Los Angeles	11.15	12.60	14.80	17.80	
New Castle, Pa. B4	8.95	10.40	12.60	15.60	
New Haven, Conn. D1	9.40	10.70	12.90	15.90	
Pawtucket, R. I. N7	9.50	10.70	12.90	15.90	18.85
Pittsburg S7	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. A1	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S1	9.05	10.40	12.60	15.60	18.55
Trenton R4	9.05	10.70	12.90	16.10	19.30
Wallington W1	9.40	10.70	12.90	15.90	18.75
Warren, Ohio T4					
Worcester, Mass. A5	9.05	10.70	12.90	15.90	18.85
Yonkers, N. Y. C5					

## BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD- In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
<b>Babcock &amp; Wilcox</b>	2	12	36.34	42.56	33.21	.....
2 1/2	12	48.94	57.31	44.73	.....	.....
3	12	56.51	66.18	51.66	.....	.....
3 1/2	11	65.97	77.25	60.30	.....	.....
4	10	87.61	102.59	80.07	.....	.....
<b>National Tube</b>	2	13	36.34	42.56	33.21	.....
2 1/2	12	48.94	57.31	44.73	.....	.....
3	12	56.51	66.18	51.66	.....	.....
3 1/2	11	65.97	77.25	60.30	.....	.....
4	10	87.61	102.59	80.07	.....	.....
<b>Pittsburgh Steel</b>	2	13	36.34	42.56	.....	.....
2 1/2	12	48.94	57.31	.....	.....	.....
3	12	56.51	66.18	.....	.....	.....
3 1/2	11	65.97	77.25	.....	.....	.....
4	10	87.61	102.59	.....	.....	.....

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

## RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb.	No. 1 Std. Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Unfinished
Beasmer U/I	5.525 6.50	6.975				
Cleveland R3						14.75
So. Chicago R3			9.75			
Ensley T2	5.525 6.50					
Fairfield T2	6.50		9.75	6.60		
Gary U/I	5.525	6.50		6.60		
Huntington C16		6.50				
Ind. Harbor J3	5.525	6.975	9.75	6.60		
Ind. Harbor Y/I			9.75			
Johnstown R3	6.50					
Joliet U/I		6.975				
Kansas City S2			9.75			14.75
Lackawanna B3	5.525 6.50 6.975			6.60		
Lebanon B3		6.975	14.50			14.75
Minnequa C6	5.525 7.00 6.975	9.75		6.60		14.75
Pittsburgh P5						14.75
Pittsburgh J3			9.75			15.25
Seattle B2			10.25	6.75		
Steelton B3	5.525	6.975		6.60		
Struthers Y7..			9.75			
Torrance C7				6.75		
Williamsport S5	6.50					
Youngstown R3			9.75			

## COKE

Furnace, beehive (f.o.b. oven) Net-Ton  
Connellsville, Pa. .... \$15.00 to \$15.75  
Foundry, beehive (f.o.b. oven) .... \$17.50 to \$19.00

## Foundry oven coke

Buffalo, del'd	\$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Eric, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

## ELECTRODES

Cents per lb. f.o.b. plant, threaded, with  
nipples, unburned.

GRAPHITE			CARBON*		
Am. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2 1/2	30	37.25			
2	24	57.75			

\* Prices shown cover carbon nipples.

## ELECTROPLATING SUPPLIES

## Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer,	
5000 lb lots	45.75
Electrodeposited	37.00
Brass, 80-20, ball anodes, 2000 lb	
or more	48.00
Zinc, ball anodes, 2000 lb lots	18.00
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon,	
5000 lb	102.25
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.70
Tin, ball anodes and elliptical \$1.07 per in.	

## Chemicals

(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum	74.80
Copper sulphate, 100 lb bags, per	
cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed,	
300 lb	45.50
Sodium cyanide, domestic, f.o.b.	
N. Y., 200 lb drums	23.05
(Philadelphia price 23.30)	
Zinc cyanide, 100 lb	59.00
Potassium cyanide, 100 lb drum	
N. Y.	48.00
Chromic acid, flake type, 100,000 lb	
or more	31.00

## BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Con- tainers	20,000 Lb.	40,000 Lb.
1/2" and smaller x 6"	49	54	56	57
5/8" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts 1/2" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44 1/2	47	48 1/2
Plow bolts, 1/2" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

## Nuts, Hex, HP reg. &amp; hvy.

	Full case or Keg price
1/4 in. or smaller	60 1/2
5/8 in. to 1 in. inclusive	55 1/2
1 1/8 in. to 1 1/2 in. inclusive	58 1/2
1 3/8 in. and larger	53 1/2

## C. P. Hex reg. &amp; hvy.

1/4 in. and smaller	60 1/2
5/8 in. to 1 1/2 in. inclusive	55 1/2
1 3/8 in. and larger	53 1/2

## Hot Galv. Hex Nuts (All Types)

1/4 in. and smaller	46 1/2
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## Semi-finished Hex Nuts

1/4 in. or smaller	60 1/2
5/8 in. to 1 1/2 in. inclusive	55 1/2
1 3/8 in. and larger	53 1/2
(Add 25 pct for broken case or keg quantities)	

## Finished

1/4 in. and smaller	63
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## Rivets

	Base per 100 lb
1/2 in. and larger	\$12.25
	Pct Off List
7/16 in. and smaller	19

## Cap Screws

Discount (Packages)

Full Finished H. C. Heat Treat

New std. hex head, pack- aged		
5/8" diam. and smaller x 6" and shorter	40	26
3/4" 5/8" and 1" diam. x 6" and shorter	22	3
5/8" diam. and smaller x longer than 6"	8	+13
3/4", 5/8", and 1" diam. x longer than 6"	+6	+32
C-1018 Steel		
Full-Finished		
Cartons Bulk		
1/4" through 5/8" dia. x 6"	58	49
and shorter		
3/4" through 1" dia. x 6"	45	33
and shorter		
Minimum quantity—1/4" through 5/8" diam., 15,000 pieces; 1/16" through 5/8" diam., 5,000 pieces; 3/4" through 1" diam., 2,000 pieces.		

## Machine Screws &amp; Stove Bolts

	Discount	Mach. Screws	Stove Bolts
		19	32
Plain Finish			
Cartons			
Bulk			
To 1/4" diam. incl.	Quantity	9	54
5/16 to 1/2" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

## Machine Screws &amp; Stove Bolt Nuts

	Discount	Hex	Square
		16	19
In cartons	Quantity		
In Bulk			
3/4" diam. & smaller	15,000-100,000	7	9

## CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.7
Chicago	134.1
San Francisco-L. A.	141.8
Dec. 1955 value, Class B or heavier 5 in. or larger, bell and spigot pipe. Ex- planation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.	

## REFRACTORIES

## Fire Clay Brick

	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$135.00
No. 1 Ohio	120.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$2.00)	21.50

## Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty	
Hays, Pa., Athens, Tex., Wind- ham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chi- cago	25.50
Silica cement, net ton, bulk, Ens- ley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

## Chrome Brick

	Per net ton
Standard chemically bonded, Balt.	\$105.00
Standards chemically bonded, Curt- ner, Calif.	115.00
Burned, Balt.	99.00

## Magnesite Brick

Standard, Baltimore	\$131.00
Chemically bonded, Baltimore	116.00

## Grain Magnesite

St. % to 1/2-in. grains	
Domestic, f.o.b. Baltimore in bulk	\$73.00
Domestic, f.o.b. Chewah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

## Dead Burned Dolomite

	Per net ton
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	\$16.00
Midwest	16.35
Missouri Valley	15.00

## METAL POWDERS

Per pound, f.o.b. shipping point, in ton  
lots, for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, West of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe.	88.0¢ to \$2.90
Aluminum, freight allowed.	38.00¢
Brass, 10 ton lots	37.4¢ to 41.5¢
Copper electrolytic	45.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe .03 max. Del'd	\$5.00
Lead	8.90¢ plus metal value
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99% .....	\$3.60 to 33.85
Nickel, chemically precipitated	45.75¢
Nickel, unannealed	\$1.00
Nickel, annealed	\$1.06
Nickel, spherical, unannealed #20	\$1.15
Silicon	43.50¢
Solder powder, 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	\$1.02
Stainless steel, 316	\$1.20
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh) \$3.75 (nominal)	
Zinc, 10 ton lots	18.5¢ to 31.7¢

# FERROALLOY PRICES

(Effective July 30, 1957)

## Ferrochrome

Contract prices, cents per lb contained		
Cr, lump, bulk, carloads, del'd. 67-71% Cr, 30-1.00% max. Si.		
0.02% C....	41.50	0.20% C.... 38.50
0.03% C....	41.00	0.50% C.... 38.25
0.06% C....	39.50	1.00% C.... 37.50
0.10% C....	39.00	1.50% C.... 37.35
0.15% C....	38.75	2.00% C.... 37.25
4.00-4.50% C, 67.70% Cr, 1-2% Si..	27.75	
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si.	26.50	
0.025% C (Simplex).....	34.75	
0.10% C, 50-52% Cr, 2% max Si....	35.50	
8.50% max. C, 50-55% Cr, 3-6% Si..	24.00	
8.50% C, 50-55% Cr, 3% max. Si....	24.00	

## High Nitrogen Ferrochrome

Low-carbon type: 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

## Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10% max. C.....	\$1.31
0.50% max. C.....	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.40

## Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (3/8" thick) delivered packed, 99.80% min. Cr (Metallic Base) Fe 0.20 max.	
Carloads.....	\$1.29
Ton lots.....	1.31
Less ton lots.....	1.33

## Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.)	
Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.	
Ton lots.....	44.65
Less ton lots.....	48.35
Less ton lots.....	51.45

## Calcium-Silicon

Contract price, per lb of alloy, lump, delivered, packed.	
30-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads.....	25.65
Ton lots.....	27.95
Less ton lots.....	29.45

## Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads.....	24.25
Ton lots.....	26.15
Less ton lots.....	27.15

## SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh.	
Ton lots.....	20.15
Less ton lots.....	21.40

## V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 28-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots.....	17.20
Ton lots.....	18.70
Less ton lots.....	19.95

## Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed.....	18.50
Ton lots to carload packed.....	19.65
Less ton lots.....	20.90

## Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.	
	Cents per-lb

Producing Point	
Marietta, Ashabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.	
Briquets, delivered, 66 pct Mn:	
Carloads, bulk.....	14.80
Ton lots packed.....	17.20

## Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.		
Manganese	Silicon	
16 to 19% 3% max.		\$100.50
19 to 21% 3% max.		102.50
21 to 23% 3% max.		105.00

## Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed.....	45.75
Ton lots.....	47.25

## Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads.....	34.00
Ton lots.....	36.00
250 to 1999 lb. delivered.....	38.00
Premium for Hydrogen-removed metal.....	0.75

## Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn....	
	25.50

## Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.			
	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn.....	37.15	39.95	41.15
0.07% max. C.....	35.10	37.90	39.10
0.10% max. C.....	34.35	37.15	38.35
0.15% max. C.....	33.60	36.40	37.60
0.20% max. C.....	32.10	34.90	36.10
0.50% max. C.....	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si....	28.60	31.40	32.60

## Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.	
Carloads bulk.....	12.80
Ton lots, packed.....	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet.....	15.10
Ton lots, packed, pallets.....	16.50

## Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$106.50 gross ton, freight allowed to normal trade area.	
Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	

## Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.			
	Ton lots	Carloads,	
		packed	packed
96.75% Si, 1.25% Fe....	22.20	20.90	
98% Si, 0.75% Fe....	22.95	21.65	

## Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.	
Carloads, bulk.....	7.70
Ton lots, packed.....	10.50

## Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.			
20% Si....	13.00	75% Si....	16.40
65% Si....	15.25	85% Si....	18.10
	90% Si....		19.50

## Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.	
Openhearth.....	3.20
Crucible.....	3.30
High speed steel (Primos).....	3.40

## Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.			
	Cast	Turnings	Distilled
Ton lots.....	\$2.05	\$2.95	\$3.75
Less ton lots..	2.40	3.30	4.55

Alsiifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.	
Carloads.....	10.65¢
Ton lots.....	11.80

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo.....	
	\$1.28

Ferrochromium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.	
Ton lots.....	\$4.90
Less ton lots.....	4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in. x D per lb con't Sb plus Ta....	
	\$4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth Pa., per pound contained Mo.....	
	\$1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton.....	
10 tons to less carload.....	\$90.00
	\$110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti.....	
	\$1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti.....	
Less ton lots.....	\$1.50
	\$1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton.....	
	\$240.00

Ferrotungsten, 1/4 x down packed, per pounds contained W, ton lots delivered.....	
	\$2.60 (nominal)

Molybdenic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa.,.....	
bags, f.o.b. Washington, Pa. Langeloth, Pa.....	\$1.41
	\$1.33

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.	
Carload, bulk lump.....	18.50¢
Ton lots, packed lump.....	20.50¢
Less ton lots.....	21.00¢

Vanadium oxide, 86-89% V <sub>2</sub> O <sub>5</sub> contract, basis, per pound contained V <sub>2</sub> O <sub>5</sub> .....	
	\$1.38

Zirconium contract basis per lb of alloy	
35-40% f.o.b. freight allowed, carloads, packed.....	27.25¢
12-15%, del'd lump, bulk-carloads.....	9.25¢

## Boron Agents

Boroxil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	
2000 lb carload.....	\$5.50

Bortam, f.o.b. Niagara Falls, Ton lots per pound.....	
	45¢
Less ton lots, per pound.....	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.	
Ton lots per pound.....	14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x 1/2 in. ton lots, f.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up	
10 to 14% B.....	.85
14 to 19%.....	1.20
19% min. B.....	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over	
No. 1.....	\$1.05
No. 79.....	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.	
Ton lots.....	\$1.46
Less ton lots.....	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots.....	
	\$2.15

## RAILWAY EQUIPMENT FOR SALE

Used - As Is - Reconditioned

### RAILWAY CARS

All Types

### SERVICE-TESTED

### FREIGHT CAR REPAIR PARTS

For All Types of Cars

### LOCOMOTIVES

Diesel, Steam, Gasoline  
Diesel-Electric

### SPECIAL

#### STANDARD GAUGE CARS

10—Air-Operated, 30-Cubic Yard,  
Drop Door

#### SIDE DUMP CARS

#### ORE HOPPER CARS

20—40-Ton Capacity

#### COVERED HOPPER CARS

15—70-Ton Capacity

### RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon  
Cleaned and Tested

### CRANES

Overhead and Locomotive

### IRON & STEEL PRODUCTS, Inc.

#### General Office

13496 S. Brainard Ave.  
Chicago 33, Illinois  
Phone: Mitchell 6-1212

#### New York Office

50-B Church Street  
New York 7, N. Y.  
Phone: BEckman 3-8230

**"ANYTHING containing IRON  
or STEEL"**

## THE CLEARING HOUSE

# Sales Spurt Absent In Detroit Area

**Used machinery sales there haven't shown a predicted mid-summer pickup.**

**Small job shop buyers probably aren't in a position to replace equipment.**

■ The midsummer sales spurt predicted for used machinery sales in the Detroit area has yet to materialize. Dealers are a little more guarded in their opinions than a few months ago. They remain hopeful but hesitant about predicting a substantial pickup in business. Some have virtually stopped buying equipment. They prefer to sit tight and see what the market is going to do.

Dealers were relying on small job shops to come into the market about now as they get going on new 1958 car programs. To date the small shops have not made their presence known.

**Profit Squeeze**—One dealer says they may not show up in any numbers. He feels the small shop can't afford to replace equipment at this time. In order to get work of any kind from auto companies, he believes, small shops will have to bid too low to leave enough profit for replacing equipment.

The ever present shortage of quality equipment doesn't help the sales picture. Good equipment can always be sold. It can't always be found. Dealers say they usually must buy four pieces of equipment in order to get one good piece.

**Later the Better**—Customers are only interested in late model equipment. Late model milling machines, boring machines and shapers can

usually find a buyer. Large sizes are in heaviest demand, as are large size presses. However, even this business has slowed somewhat in the past few months. Toolroom equipment is selling fairly well, but once again dealers' supplies far exceed present market needs.

However, a few dealers confuse the picture with reports they are offering fairly late model grinders, shapers, and mills with few takers.

**Mix Things Up**—Used machinery dealers are working hard to stir up some action. Expensive brochures list machines and equipment available. One dealer offers a 30-day return guarantee.

Most sales continue to be made outside of Detroit. Dealers report as much as 75 pct of their business comes from outside that area. From 40 to 50 pct of their business still comes to the dealers from neighboring states.



"Air or water hardened?"



# CONSIDER GOOD USED EQUIPMENT FIRST

## AIR COMPRESSOR

450 cu. ft. Ingersoll Rand XRE, 100% Pressure 100  
H.P. Worthington Model 110 3/4 in.

## BENDER & STRAIGHTENER

Pels Type JH 20 Bends & Straightens Beams 15x5.84  
300 lb., Angles Equal 55x5 1/2, etc.

## BENDING ROLLS

10' x 3/4" King Pyramid Type, LATE  
16' x 3/4" Rammer, Pyramid Type  
20' x 1 1/2" Hilles & Jones Pyramid Type

## BRACKS—LEAF TYPE

12' x 1 1/2" Drets & Krump  
12' x 1 1/2" Drets & Krump No. 228

## BRACKS—PRESS TYPE

12' x 1 1/2" Superior Hydraulic, NEW  
100 ton Pacific Hydr. Model #2100 overall width 8',  
21" Horn Extension

## BUILDINGS

70' x 200' x 20'  
50' x 20' x 24'

## BULLDOZERS

27' Atlas 22 Stroke, 12" x 30", Face of Crosshead  
27' W&W 22 Stroke, 12" x 30", Face of Crosshead

## CORRUGATING MACHINE

12' Stano Corrugating Machine Rolls 21" Dia.

## CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H  
3 ton Whiting  
3 ton Case  
3 ton P&H  
10 ton Shepard Niles  
15 ton Shepard Niles  
15 ton Shepard Niles  
15 ton Shepard Niles  
15 ton Shepard Niles  
15 ton Shepard Niles  
20 ton P&H

## DRAW BENCH

10,000 lb. Atlas Standard Single Draw Tube Draw  
10,000 lb. Atlas Standard Single Draw Tube Draw

## FORGING MACHINES

1" to 3" Atlas, Atlas National  
HAMMERS—BROAD DROP—STEAM DROP—STEAM  
FORGING—500 lb. to 20,000 lb.

## LEVELERS—ROLLER

37" Torrington 10 Roll 1 1/2" x 32" Dia. Backed up  
32" Bliss Capacity 125" LATE  
34 McKay 12 Roll 1 1/2" Dia.

## PLANNER—PLATE EDGE

27" Southway, 16 Pneu. Jacks, Capy. 112"

## PRESSES—HYDRAULIC

200 ton Bliss Hydro-Dynamic, 18" Stroke, Red Area  
54" x 35"

## PRESSES—TOGGLE DRAWING

1000 lbs. Atlas Hydraulic Hydr. Forging Press  
21018 Bliss 750", Die Space 60" x 72"

## PUNCH & SHEAR COMBINATIONS

Cleveland 800 G. Single End for Forge  
Cleveland Style W. 60" Turret  
No. 13" Buffalo Universal Hammer

## ROLLING MILLS

9' x 6" Torrington Wire Flattening Mill Line  
10" x 14" Single Stand Two High  
10" x 16" Single Stand Two High  
12" x 12" Single Stand Two High  
12" x 16" Single Stand Two High  
16" x 20" Parallel Two Stand Two High  
16" x 20" Parallel Two Stand Two High

## SHEAR—ALLIGATOR

No. 1 Motor RH LN, Capacity 2" x 12"

## SHEAR—BAR

12" x 3/4" Niagara Model 1212, NEW 1951

## SHEAR—GATE

12" x 3/4" Niagara Model 1212, NEW 1951

## SHEAR LINES

36" Hutton Shear Line  
36" Shear Line, With Leveler & Tables  
36" 1 1/2" Dia. Cleveland, With Pneu. Leveler, Etc.

## SHEARS—SQUARING

6' x 10' Ga. Niagara No. 672  
8' x 14" Niagara, NEW 1952  
10' x 12" Cincinnati 2270  
10' x 12" Cincinnati 2270

## ROLLS—PLATE STRAIGHTENING

72" Hilles & Jones 6 Roll 1 1/2" Dia.  
60" Niles-Rammet P 7 Roll 1 1/2" Dia.

## SHEARS—ANGLE

24" Hilles & Jones  
24" Hilles & Jones

## SLITTERS

21" Victor Slitting Line  
21" Victor Slitting Line

## STRAIGHTENERS

8" Motor, Roll Capacity to 1 1/2" Tubing  
Kahn & Ruch Roll Straightener & Cut-off Capabilities  
2 1/2" to 4" Hot Bars

## SWAGING MACHINES

1 1/2" Capacity 24" Tapping, LATE  
2 1/2" Capacity 24" Tapping, LATE  
Die Length Hydraulic Feed, LATE

## WELDERS—SEAM

200 KVA Progressive Universal 220 Volt  
100 KVA Federal Universal 220 Volt  
500 KVA Federal Universal 220 Volt

## WIRE MACHINERY

24" Victor 12-Die Continuous Wire Drawing Machine  
1 1/2" Capacity 1 1/2" Dia. B&S Co.  
1 1/2" Capacity Wire Drawing Machine 22" Diam.  
Hot Bars

## Manufacturing

## A. T. HENRY & COMPANY, INC.

50 CHURCH ST., NEW YORK CITY 8

Telephone COlton 7-3437

## Equipment

Confidential Certified Appraisals

Liquidations — Bona Fide Auction Sales Arranged

Consulting Engineering Services

Surplus Mfg. Equipment Inventories Purchased

## REBUILT—GUARANTEED ELECTRICAL EQUIPMENT SLIP RING MOTORS

Constant Duty—3 phase, 60 cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	2500	Whase.	CW	4600/2300	720
1	2500	G.E.	M111	2300	210
1	1800	Whase.	M111	6600/4000	270
2	1800	Whase.	M111	2200	272
2	500	Al. Ch.	ARY	2300	505
1	500	G.E.	L.M.	2300	450
1	400	Al. Ch.	ARY	2300	505
1	400	Whase.	CW	2200	290
1	350	G.E.	1-M-15B	2200	1180
1	350	G.E.	MT-112	2200	450
1	300	Whase.	CW 1012	2200	720
1	250	Al. Ch.	ARY	410	705
1	250	G.E.	MT-414	2300	300
1	200	G.E.	1-M	2200	1760
2	200	G.E.	1-17-M	2200	585
1	200	G.E.	1-11-M	2200	480
1	150	Al. Ch.	ARY	410/220	720
1	150	Whase.	CW	4160/2200	585
1	150	Whase.	CW-1000	410	435
1	100	Whase.	CW	410/220	1160
1	100	El. Dy.	EDX-612	2200	900
2	100	G.E.	MT-562	410/220	570
2	100	G.E.	1-15A-M	2200	495
1	100	Al. Ch.	ARY	410	435

## SYNCHRONOUS MOTORS

3 Phase, 60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	1250	G.E.	100	2200	2600
1	1500	G.E.	80	2400/4160	900
1	1500	Whase.	80	2300	514
1	920	G.E.	80	2200/440	300
1	710	G.E.	80	2200	720
1	450	Whase.	100	2200	128.5
3	250	G.E.	100	2300	900
1	200	G.E.	100	2300	720
1	200	G.E.	80	2200	600
2	200	G.E.	80	410	400
2	250	Whase.	80	410	600
1	200	Al. Ch.	100	2200	514
1	200	Al. Ch.	100	2200	300
1	150	G.E.	100	2200	900
1	150	El. Mebr.	80	220	720
1	150	G.E.	100	550	600
3	185	G.E.	80	4000/2200	1200
1	125	G.E.	80	2200	900
1	100	Whase.	80	410/220	1800
1	100	Idéal	80	410/220	900
2	100	G.E.	80	410/220	300
1	100	El. Mebr.	100	410/220	600
2	50	G.E.	80	2200	600

## T. B. MAC CABE COMPANY

4302 Clarissa St., Philadelphia 40, Penna.

Cable Address Phone  
"Macsteel" Philadelphia, Pa. Davenport 4-8300

## RE-NU-BILT GUARANTEED

## ELECTRIC POWER EQUIPMENT A. C. MOTORS

3 phase—60 cycle

## SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
2	1750	G.E.	M-3798B	4800	1800
1	1500	G.E.	MT	6000	1187
1	1100	F.M.	OVZK, B.B.	4800	1800
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-578	2200	1190
1	700	A.C.	CW	2300	500
1	500	Whase.	CW	350	350
1	400	Whase.	CW	410	514
1	350	Cr. Wh.	Size 71	208/416	1765
1	350	G.E.	IM-17A	440/2200	720
1	300	G.E.	MT-121V	4000	257
1	250	Cr. Wh.	Size 299	2200	350
1	250	Al. Ch.	IM	550	600
1	200	G.E.	IE13 B-M	220/440	1760
1	200	G.E.	MT-557Y	220/440	1760
1	200	Cr. Wh.	20QB	410	505
1	200	G.E.	IM	410	435
3	200	G.E.	1-17AM	2200	435
1	200	G.E.	IM	2200	380
1	150 (unused)	Whase.	CW	2200	435
1	125	A.C.	IM	410	805
1	125	Al. Ch.	IM	410	720
1	100	G.E.	IM-10	2200	435
1	100	G.E.	IM	410	600
4	100	A.C.	ANY	410	695

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1	800	G.E.	KT-573	2200	1180
1	650	G.E.	FT-550BY	440	3570
3	500	Whase.	CS-1216	2200	500
2	450	Whase.	CS-1420	2300/1150	354
1	400	G.E.	IK	2200	300
1	300	G.E.	FT-550A	2200	1775
1	200	G.E.	IK-17	440	580
2	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440/900	450
1	150	Whase.	CS-8568	440	880
1	150	Whase.	CS	410	580

## SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	RPM
1	7000	G.E.	ATI	2200/6000	600
1	4350	C.W.	3501814000/6000/13800	514	
1	2850	Whase.	80-F	2200/4000	514
1	2800	Whase.	80-F	2200	720
1	2000	Whase.		2200	120
2	1750	G.E.	ATI	2200/5800	5800
1	735	G.E.	ATI	2200/12000	400
1	450	Whase.		2200	128.5
1	325	G.E.	ATI	410	1800
1	225	G.E.	ATI	410	1800
1	100	G.E.	TS-7556	220/410	900

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No. 20 H. O. Baker Hydraulic feed drilling and boring machine  
24" swing 3 spindle Allen No. 3 production high speed sensitive drill  
8 spindle Model SLV David and Thompson Rotomatic vertical drill, new 1953, MD  
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53" No. 24A Gardner vertical spindle horizontal disc MD grinder  
No. 72A3 Heald Sigmatic internal grinder, MD  
No. 72A3 Heald Sigmatic swivel headstock internal grinder  
20" No. 25A Heald hydraulic rotary surface grinder 6" x 72" Thompson round broach grinder, first class  
No. 6-1 Nazel pneumatic die forging hammer  
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No. 3 Gisholt universal ram type turret lathe, bar feed  
Model 1H6 Libby saddle type turret lathe, bar feed, hardened ways  
Model 2-H-8 Libby turret lathe  
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No. 34-36 Cincinnati duplex hydromatic mill, rise and fall  
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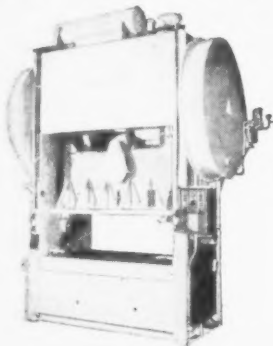
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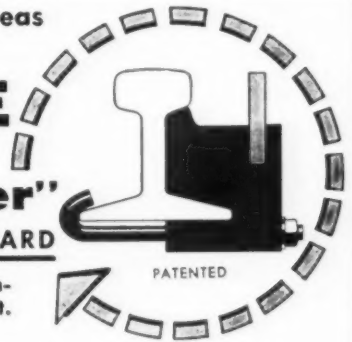
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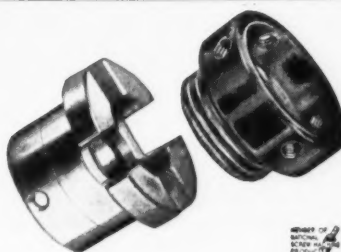
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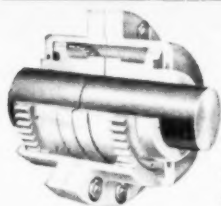


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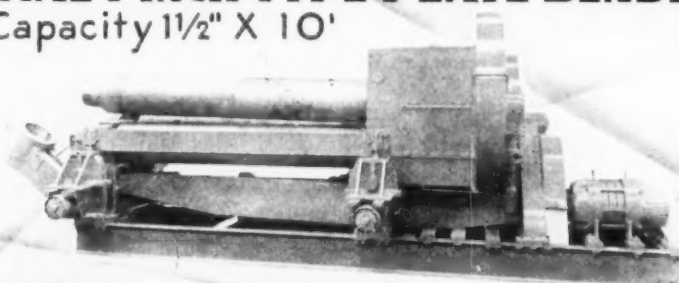
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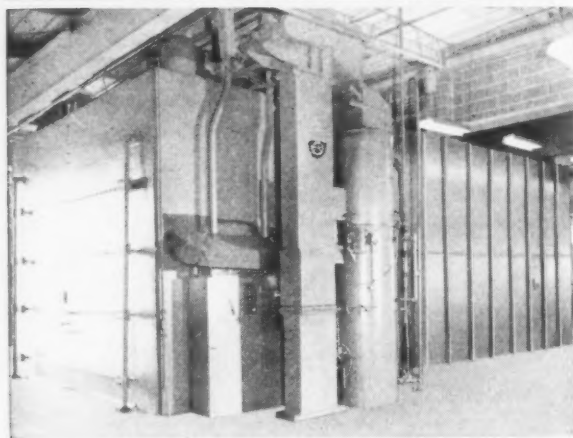
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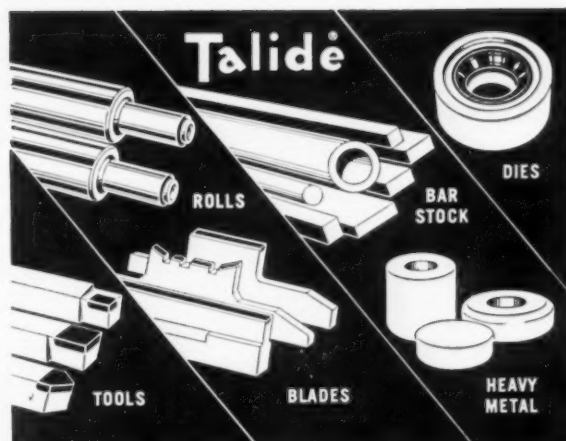
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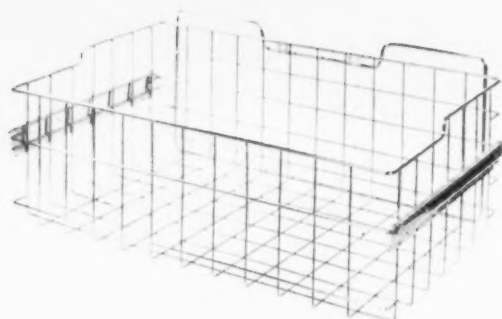
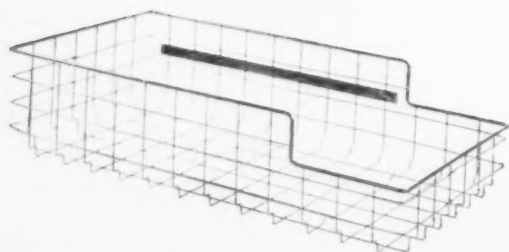
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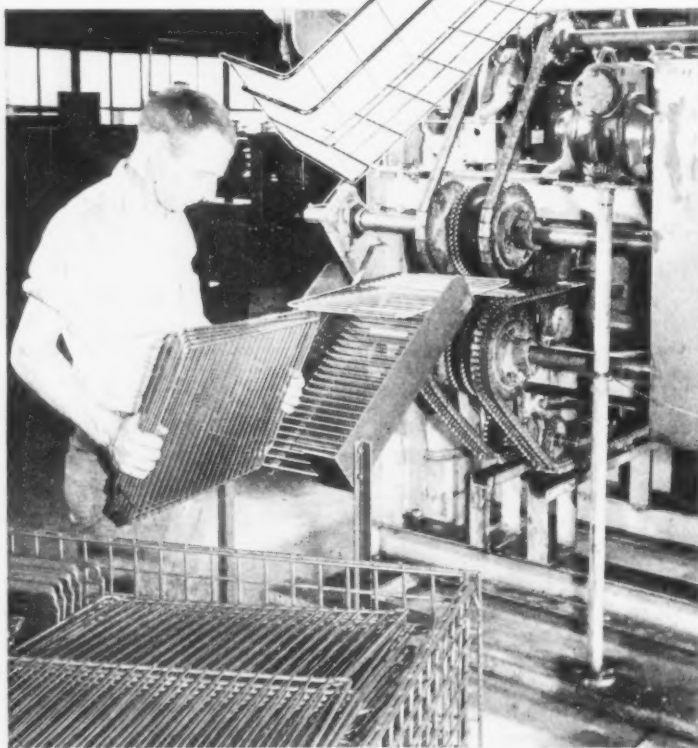
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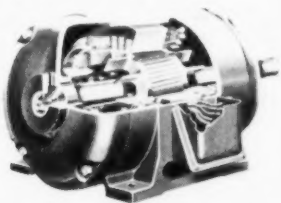




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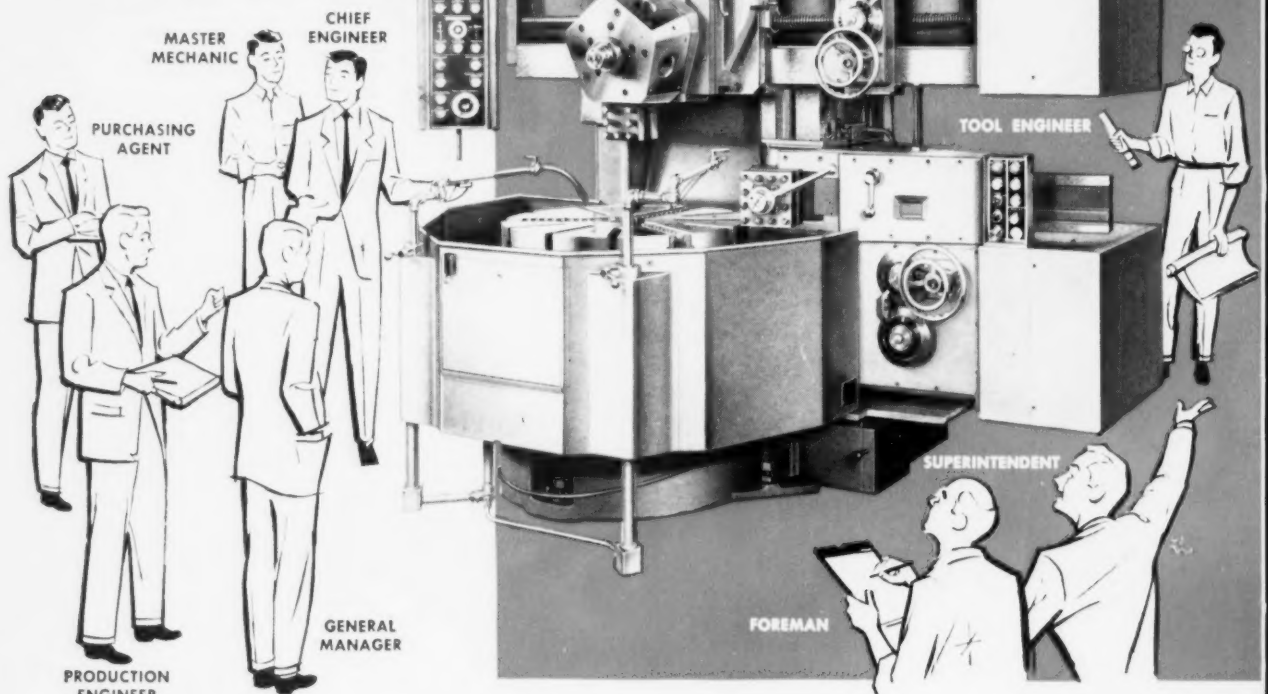


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